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## THE VALUE FACTOR IN CHILDREN'S SIZE PERCEPTION<sup>1</sup>

ABRAHAM BLUM  
*Purdue University*

The question of psychological factors influencing size estimation or perceived apparent size has been with us for some years. The report by Bruner and Goodman (2) of their experiment with size estimation of coins was widely accepted as illustrating what psychologists have observed for many years, namely, that an individual's need and value systems affect (or distort) his perceptual processes. However, when Carter and Schooler (6) repeated the Bruner and Goodman experiment, certain of the new findings did not coincide with the earlier results.<sup>2</sup> Bruner and Goodman concluded, "First off, coins, socially valued objects, are judged larger in size than gray discs (matched in size for each of the coins). Secondly, the greater the value of the coin, the greater is the deviation of *apparent* size from actual size" (2, p. 28). On the other hand, Carter and Schooler stated, "It was found that the size of small coins is generally underestimated and the size of large coins is overestimated" (6, p. 207). This was also found for cardboard and aluminum discs.

Such divergent results could only lead to re-evaluation of the original hypotheses and conclusions. Bruner and Rodrigues attempted "to explore some of the factors which might conceivably have produced divergencies in the findings of these two pairs of experimenters" (5, p. 17). They designed their experiment to (a) repeat the original Bruner and Goodman study, (b) utilize the modifications of Carter and Schooler, and (c) include additional variations. Important variations were the establishment of an accuracy-oriented set in half the subjects and a value-oriented set in the

<sup>1</sup> This research was made possible by a faculty grant from the XL Fund of the Purdue Research Foundation.

<sup>2</sup> Since we are here only interested in "value" as a possible factor in perception of size, we will not discuss results concerned with "need."

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remaining subjects; and the use of three types of light patch size estimation instruments.

The results of this investigation showed that coins were seen as significantly larger than cardboard discs, while metal discs were overestimated more than coins. Bruner and Rodrigues term such comparisons, "absolute level of accentuation." With such results the question of value as a factor in accentuation of size estimation remains unanswered. However, Bruner and Rodrigues used another form of comparison, "relative level of accentuation." They hypothesized that "the increase in overestimation going from a penny to a quarter should be greater for coins than for correspondingly sized discs" (5, p. 19). *Relative* distortion was found to be significantly greater for coins than for other discs, when size estimations of the quarter were compared to size estimations of the penny or nickel.

As for value and accuracy "sets" in relation to size estimation, it was found that "There is a tendency for accuracy set to increase absolute overestimation of discs and coins. With respect to relative accentuation, an accuracy set increases it for valueless discs. For coins, on the other hand, a value set augments relative accentuation under certain conditions. Under others, set has no effect on coins" (5, p. 24). Bruner and Rodrigues also found, "It is difficult to say anything definitive about the effect of the shape of variable light patch used (5, p. 24).

Considering these variable results from three experiments, it would be well to re-examine Bruner and Rodrigues' statement, "Finally, on the basis of the present study and on such others as those mentioned above, it is evident that the value of objects affects their phenomenal appearance" (5, p. 24), since they later conclude, "It appears to us that what differences remain between the original findings of Bruner and Goodman and Carter and Schooler will have to be resolved not by repeating the conditions of their experiments, but by devising new types of experiments . . ." (5, p. 24).

These contradictory interpretations and conclusions could only suggest misgivings about any variable or concept to be included in psychological theory. Why then has there been continued stress on the Bruner and Goodman and/or Carter and Schooler findings when Bruner, himself, felt that the divergencies warranted further investigation?

Perhaps there is a relatively simple answer to this question. Empirical observation over the years has led many social psychologists and personality theorists to the acceptance of value (and need) as organizing factors in phenomenological appearance. One might go so far as to suggest that a form of *a priori* thinking has organized the perception of those who see great importance in experimentally establishing the existence of value as a factor in perception.

The present author readily admits to similar preconceived notions, herein called hypotheses. However, he wishes to differ with certain previous writers in concluding that existing results have confirmed such hypotheses. Rather, theorists and/or experimenters interested in the problem must be prepared

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to analyze the possible reasons for the existing equivocal findings and formulate more decisive methods for testing (or retesting) the original hypotheses, so that more substantial results may come forth. Obviously such results might prove disastrous to present theory. This is not to be feared, as such, for re-interpretation and re-examination is as vitalizing a force as is: "We found what we *knew* existed."

Since Bruner and Rodrigues found no important differences related to placement of coins, or variation in variable light patch used, it may be the basic variable, value, which must be re-examined. Specifically, the operational use of *coins as valued objects* may need to be reconsidered and the use of a light patch instrument, as such, may be questioned.

Value is at best a relative concept. When one uses a symbol (coin) for which value is in actuality a "secondary" quality, it is difficult to term such an object a socially-valued object or an object of value, *per se*. By secondary is meant the fact that coins, in themselves, represent value in a purchasing or (ultimately) in an acquisitive exchange sense. Therefore, there exists the problem of what is acquired. Would a child see a quarter as having greater value when it buys castor oil (which he needs) as compared to a penny with which he can buy candy (which he does not need) or as compared to a cardboard disc which he sees as a plaything? Obviously one must consider the context in which value is defined, as well as individually-derived value systems. Although we are here only concerned with the value "factor," it is well to note Luchins' critical comment concerning the factors of need and value in the Bruner and Goodman investigations: "... is it entirely reasonable to assume that the need for money is inversely related to the amount of money possessed by one's family? The values that a particular child placed on money and the particular circumstances which might have influenced the child's need for it at the time of the experiment were not taken into account. It seems to us to be a far cry from determining a subject's subjective need for money to assuming arbitrarily that any child in the 'poor group' had more of this 'need' than any child in the 'rich group'" (11, pp. 89-90).

As for the instrument, it is true that Bruner and Rodrigues found no significant differences for the three light patches used, but the very complexity of manipulating a knob to vary the size of a circle of light may introduce extraneous factors. In addition, whether the subject considers the area, perimeter, or diameter of the circle in his size estimations may add to the variability of the obtained results.

#### EXPERIMENTAL DESIGN

This study, therefore, was designed to re-examine the question of value as a factor in size perception. The specific design considers that value, to the individual, is inherent in the ownership of an object which is deemed desirable by this individual. Each subject's estimation of the length of a

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valued (owned) object was compared to his estimation of the length of an identical, neutral (not owned) object. With this method each individual was a control for himself, and his estimation of the Critical (value) object was directly comparable to the identical, Noncritical (neutral) object. The use of a linear-type measurement instrument was considered to offer a method of avoiding possible extraneous factors which might occur when "roundness" is involved in size estimation. Similarly, two testings, seven days apart, were used in an attempt to provide results less affected by any special temporal occurrence in the subject's experience.

The subjects were chosen because of the comparative homogeneity of their socioeconomic backgrounds, social experiences in groups, and lack of sophistication in terms of size or measuring nuances. At the same time, since each subject was compared to himself, differences in manipulative or visual ability were considered as not affecting the final results.

The stimuli were chosen on the basis of the interest level and age of the subjects.

### HYPOTHESES

I. The mean size perception of an object will be affected by the presence of value "in" the object. Specifically, the presence of value will accentuate the perceived size of an object as compared to the size perception of an identical object of neutral or no value.

This hypothesis is a restatement of the proposition examined by Bruner and Goodman, Carter and Schooler, and Bruner and Rodrigues.

II. Within a group, most individuals will perceive and behaviorally indicate a valued object as larger than an identical object of neutral or no value.

Hypothesis II was not considered by the previously mentioned investigators. Such an omission seems strange when one notes that the concept of value in previous studies is described as a quality or factor determined by each individual for himself, rather than by the collective group.

### METHOD

#### *Subjects*

The children in this experiment attended the Purdue Summer Session Nursery School. They ranged in age from 33 to 59 months. Of the 20 children in the nursery school group, 16 participated in the experiment (one refused the procedure and three did not comprehend the task). In the formulation of the experimental design it was decided to have a younger and older group, arbitrarily defined as above or below 40 months in age. This resulted in an *N* of 8 for each subgroup. The purpose of this subgrouping was to test for possible age differences in the phenomenon under investigation.

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All subjects were children of students at Purdue University. Thirteen of the fathers were graduate students and three were undergraduates.

## Apparatus

A diagrammatic sketch of the measurement instrument is shown in Figure 1. The measuring device was modeled after a foot-size fitting stick used in retail shoe stores.

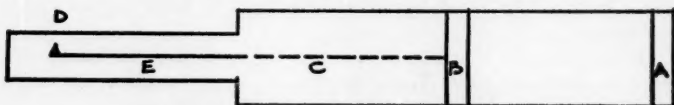


FIGURE 1—A diagrammatic sketch of the measuring instrument.

A is a stationary guide ( $2\frac{1}{8}$  in. high), while B, identical to it, is movable. Attached to the underside of B is a rod, C, whose pointer, D, indicates the actual distance between A and B on the meter stick, E (range = 0 to 51 cm.). Since B can be moved in either direction, size estimations can be shown by moving B away from, or toward, A. Thus, there are two possible starting positions: Open, when B has to be moved towards A and Closed, when B has to be moved away from A.

The subjects were seated in front of the measuring device which rested at the near edge of a table ( $19\frac{1}{4}$  in. high). The stimuli were placed on a presentation table 7 ft. from the measuring device. The presentation table was 33 in. high, so that the subject could see the near side of each object but was not able to see the object in depth.

The chair (seat height = 10 in.) was so placed as to have the midline of the subject in a direct line with the center of the presentation table.

## Stimuli

A comb, a toy canoe and a home toy were the stimuli for this experiment. Since the subjects were all members of the same nursery school group, each had an identical comb supplied as part of the nursery school washroom equipment. The canoes were furnished to the parents of each child with instructions that the toy be given to the child on designated dates, two days before his testing. In this way each child had his own canoe for an equal period of time prior to testing, despite the fact that the testing time for all the subjects was distributed over four successive days. As a result of this testing schedule there was some variability in the period of ownership of the combs, but not more than three days' difference between any of the children. Each of the home toys was owned by the individual subject prior to the experiment. Home toys were chosen on the basis of availability of duplicates at local stores. This procedure resulted in there being 15 different home toys (baby buggy, miniature football, harmonica, hand iron,

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etc.), ranging in length from 5.9 to 24.0 cm. Length of ownership for the home toys was not controlled.

### *Procedure*

The children were tested in an office adjacent to the nursery school rooms. The experimental room and the experimenter were known to the children prior to the time of testing. When the canoes were distributed to the parents, a schedule was included, giving the days when each child would be tested. On those days the child brought his home toy and canoe to school.

Each child, after obtaining the two toys and comb from his locker, was taken to the testing room. There, the subject (*S*) was seated at the table. His comb, canoe and home toy were then placed out of view.

Testing I: The examiner (*E*) announced, "We are going to play a game in which we show how big things are. See this block. (Standard nursery school block, 14 cm. in length). If we wanted to show how big it is we could do this." The block was placed in the measuring device, and taken out. "See, that is how big it is. Now you show me how big it is." The apparatus was closed and the block was placed on the presentation table. This procedure was repeated with the measuring device at the Open position.

After the introductory demonstration, *S* was asked to indicate four size estimations for each pair of objects. The instructions were, "Now you show me how big this is." (The testing sequence is described below.)

Testing II: In the second testing, the introductory demonstration by *E* was omitted, but *S* was asked to show the size of the block from the Open and Closed positions. Measurement trials were identical to those in Testing I.

### *Sequence*

The following testing sequence design was constructed:

Testing I: Order of testing subjects and order for presentation of the three objects to each subject were randomized. For each subject, for each of the three objects, the sequence of Open and Closed beginning position of the measuring device was determined at random. The sequence of presentation of Valued (*S*'s toy) and Nonvalued (*E*'s toy) objects for the two Open and two Closed positions (for each object) was then determined at random. Therefore, for each of the three objects, there were eight possible presentation orders (e.g., (1) Open Valued, Open Nonvalued, Closed Nonvalued, Closed Valued; (2) Closed Nonvalued, Closed Valued, Open Nonvalued, Open Valued; (3) . . . , etc.). By this method, each *S* was presented with two successive Open or Closed position trials before the other position was presented. With this sequence, however, no *S* could have more than two Valued or two Nonvalued presentations in succession.

Testing II: The subject order of Testing I was followed to maintain a seven-day interval between testings for each *S*. All other procedures were identical to Testing I.

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### RESULTS<sup>3</sup>

#### *Valued-Nonvalued*

The experimental design called for an analysis of variance of the "repeated measurements" or "split-plot" type, with the subjects divided into two age groups (eight subjects each). The repeated measurement factors were: Testing I vs. Testing II, Valued Object vs. Nonvalued Object, Open beginning position of the measuring device vs. Closed beginning position, and their interactions. Since all of the factors have only two categories (or "levels") each, it was possible to carry out all tests of main effects and interactions in the form of  $t$  tests. The procedure was as follows: For each of the "repeated measurements" main effects or interactions, a "score" of the appropriate type was formed for each subject. For instance, for the "Valued vs. Nonvalued" main effect, each subject's "score" was the total of his four estimations of the Valued object minus the total of his four estimations of the Nonvalued object; for the "Valued-Nonvalued by Testing" interaction, each subject's "score" was the difference between his Valued and Nonvalued totals in Testing I minus the difference between his Valued and Nonvalued totals in Testing II. The variance of these "scores" was then computed for each age group, and these two variances were compared with an  $F$  test. If this  $F$  was not significant at the two-tailed 5 per cent level, the assumption of homogeneity of error variance was considered tenable, and the two variances were pooled for use in the two  $t$  tests depending on this error variance (described below). These  $t$  tests each had 14 degrees of freedom. On the other hand, if the  $F$  was significant, the two variances were not pooled, but were used separately in the two  $t$  tests to follow, the degrees of freedom in these  $t$  tests then being estimated by the Welch-Satterthwaite method (13). The test of the particular main effect or interaction in question then consisted of a  $t$  test on the average of all 16 "scores" of the type described above, testing the hypothesis that this average was merely a random deviation from a "true value" of zero. Using the same error variance, the test of the interaction with age groups of this main effect or interaction consisted of a  $t$  test of the difference between the age group means for the same "scores." Besides facilitating the carrying out of the tests in the presence of significantly nonhomogeneous error variance (which did occur several times), this method also made it possible to carry out *one-tailed* tests of main effects or interactions, where this was indicated. For example, in the test of the difference between average size estimation of Valued objects and average estimation of Nonvalued objects, the former was expected by hypothesis to be larger, and the *one-tailed* test was appropriate.

<sup>3</sup> Grateful acknowledgement is made to James Norton of the Purdue Statistical Laboratory for his invaluable assistance in the formulation and description of the statistical analysis and corresponding sections of the experimental design.

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An analysis of the type described above was carried out for each of the classes of objects used in this experiment: comb, canoe, and home toy. In the case of the home toy, two such analyses were performed, one in which the *absolute* size estimations were used as the basic data for the analysis, even though the actual size of the toy differed from child to child, and the other in which the basic data were the *relative* size estimations, i.e., absolute size estimation divided by actual size of toy.

In Table 1 it is seen that the Valued estimations averaged significantly larger than the Nonvalued estimations for the comb and the canoe, whereas the Valued and Nonvalued average size estimations for the home toy were approximately equal.

TABLE 1.  
AVERAGE DIFFERENCE IN SIZE ESTIMATION BETWEEN VALUED AND  
NONVALUED OBJECTS

Object	Average Difference ( <i>N</i> = 16)	Standard Error of Difference*	<i>t</i> (14 <i>df</i> )	Level of Significance (one-tailed <i>t</i> test) <sup>†</sup>
Comb .....	1.77 cm.	.839 cm.	2.11	5%
Canoe .....	2.10 cm.	.757 cm.	2.77	1%
Home toy (absolute size)	-0.11 cm.	.831 cm.	-0.13	N.S.
Home toy (relative size)	-0.02 cm.	.068 cm.	-0.23	N.S.

\* Assumption of homogeneity of error variance was tenable in all these cases.

<sup>†</sup> For 14 *df*:  $t_{95} = 1.76$ ,  $t_{99} = 2.62$ .

#### *Relative Level of Accentuation*

To compare the average Valued-Nonvalued differences for the three types of objects, a "repeated measurements" type of analysis of variance was performed in which the individual observations were the average Valued-Nonvalued difference for each child, for each object. The children were separated into age groups, as before. Two such analyses were performed. In the first the observations were the actual differences. In the second, the observations were the differences divided by the actual size of the corresponding object. In both analyses, when individual comparisons were made among the average differences for the three objects, no significant differences were found among these average differences.

In actual (absolute) size units, the comb (13.1 cm.), home toy (average = 14.0 cm.) and canoe (24.6 cm.) have average Valued-Nonvalued differences of 1.77 cm., -0.11 cm. and 2.10 cm. respectively (see Table 1). The difference between any two of these required for significance at the 5 per cent level is 2.38 cm. (7). In relative units (estimated size divided by

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actual size), the three objects yield average Valued-Nonvalued differences of .135, -.016 and .085, respectively. The difference between any two of these required for significance is .176.

Table 2 presents the number of subjects who estimated each Valued object as larger on the average than the corresponding Nonvalued object. It is seen that although in all cases half (eight) or more of the children accentuated the size of the Valued objects, in only one case, for the canoe, was the number of children significantly greater than the chance expectancy of one-half.

TABLE 2

NUMBER OF SUBJECTS WHOSE MEAN ESTIMATE OF THE VALUED OBJECT WAS LARGER THAN THE MEAN ESTIMATE OF THE NONVALUED OBJECT ( $N = 16$ )

Object	Number of Subjects Estimating Valued Object on the Average as Larger	Level of Significance (one-tailed binomial test)*
Comb .....	10	N.S.
Canoe .....	12 (plus one tie)	5%
Home toy (absolute size) ..	8	N.S.
Home toy (relative size) ..	8	N.S.

\* From Binomial Tables, the probability of 12 or more out of 16 estimating the Valued object as larger by chance is approximately .04.

Significance tests were also made for the other three main effects provided by the experimental design, as well as six first-order interactions and three second-order interactions. These tests were made for each of the three objects, using both absolute and relative data for the home toy. Of these 48 tests, only one, a second order interaction, was found to be significant.

## DISCUSSION

Two interrelated questions arise from these findings: Why are the valued objects in two cases (comb and canoe) seen as significantly larger than identical objects, while the third (home toy) is not? Secondly, why was this the case when the home toy might be expected to be even more "valued" than either the canoe or the comb? The latter question is even more interesting in light of the Bruner and Rodrigues concept of "relative level of accentuation" which suggests that the greater the comparative value of an object the greater will be the overestimation of its size.

It can only be suggested that since it was necessary to use as home toys objects available in local stores, (a) the experimenter may not have been

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successful in obtaining toys which had significant value to the individual children, (b) many of the home toys were not predominantly linear in construction as were the comb and canoe, (c) for young children variability in the period of ownership may effect the value of a toy.

## CONCLUSIONS

It may be concluded that value, as herein defined, (a) does affect size estimation and (b) accentuates apparent size of an object for the perceiver (Table 1 presents results for Hypothesis I). This statement must be qualified, however, because for one of the stimuli such a conclusion is not justified. It may be important to note that this stimulus, the home toy, was different for 15 of the 16 subjects and it was previously observed that other extraneous factors may have been involved. In addition, it is noted that the effect of value upon size perception is accentuation of *average* estimated size of the comb and canoe for the group, but this is not necessarily true for each individual (Table 2). Beams (1) reports parallel results. He found that for a total of 60 subjects, on the average, "liked" foods were seen as significantly larger than "disliked" foods. However, nine of his subjects saw "disliked" foods as larger than "liked" foods. This latter finding led Beams to suggest, "... that there are questions regarding 'perceptual distortion' still unanswered" (1, p. 199).

The primary question seems to be: What classification of value is a factor in size perception? Is it value in the social sense (coins), value in terms of affectivity, value in terms of ownership or a combination of these and/or other types of values, which create size distortion? It may well be that the answer to this question will be different for each individual perceiver. Such an answer might also provide knowledge concerning the specificity of value for individuals.

Noting the results, a variation of the above question may suggest that it is the object of value itself which must be investigated. This concept has many facets; usage, availability, familiarity, social pressures, cultural standards, all of which may be involved in individual value and need systems. If such is the case, then past investigations have barely scratched the surface of the problem of value as a factor in perception.

One would presume that in cultures where increasing size is not a positive "attribute," if size distortions occur at all, they may occur in either direction. Likewise, the direction that was found (overestimation), may be specific for a particular segment of our culture. It is interesting to note that Bruner and Postman discuss a similar concept in terms of symbolic negative and positive values when concluding, "The *direction* and *magnitude* of accentuation, however, may be a function of the particular values involved" (4, p. 207).

On the question of possible age differences, of greater magnitude than in this sample, it would be important to know whether another study,

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similar to this one, would find similar results for a sample of 9- to 11-year-old children (as were used by Bruner, Carter, etc.). Such a finding would allow for much greater generalization and possibly supply a more definitive solution to the dilemma created by the previous contradictory results. Such a re-examination of these findings based on older subjects may be fruitful, especially since Beam's results were found with subjects drawn from fifth and sixth grade classes (10-12 years).

#### SUMMARY

Because of the variable results previously reported for size estimation of valued and nonvalued objects, a new experimental design was devised. Size estimations were made on a linear scale device for three sets of stimuli. Each set consisted of two identical objects, one having value to the subject (by virtue of ownership), and the other object being of neutral or no value.

Size estimations were obtained from 16 children between the ages of 33 and 59 months. The results of a comparison of these size estimations, for two of the three sets of objects, support the hypothesis that value is an accentuating factor in size perception.

The hypothesis that more individuals would estimate the valued object as larger than the neutral object was not supported by the data. Only one valued object was seen as larger by significantly more than half of the sample, although eight or more subjects did perceive the size of the other two valued objects as larger than the corresponding nonvalued objects.

The data were also analyzed to test for the concept of "relative level of accentuation." This was done using absolute and relative (absolute divided by actual) size estimations. In neither case did the present results support the Bruner and Rodrigues findings.

It is suggested that the simplified measuring device used in this study may have contributed to the possibility of obtaining precise size estimations from very young children. It is further suggested that this method be used with older children and adults in order to re-examine groups similar to the subjects used in previous investigations.

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## AFFECTIONAL AND AGGRESSIVE BEHAVIOR OF PRESCHOOL CHILDREN<sup>1</sup>

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Much has been learned about children's aggressive behavior (e.g., 1, 2, 3, 4, 5, 6, 7, 8, 11, 12), but little is known about the behavior of young children which is friendly or affectional in nature, or the comparative frequency with which young children express affectional and aggressive behavior. The objectives of the present study were to compare with respect to age and sex: (a) the number of affectional and aggressive responses evidenced during self-directed activity periods in a nursery school-kindergarten setting, (b) the frequency with which preschool children initiated contacts by means of either affectional or aggressive behavior, and (c) the individuals (boys, girls, adults) chosen as the recipients of these contacts.

Affectional behavior was defined in the present study as behavior directed toward another person which indicated warm regard, friendliness, sympathy, or helpfulness. Aggressive behavior was defined as an actual attack or threatened attack upon another person, whether it be by gesture or hostile or provocative language directed toward another child or adult (1). Affectional or aggressive behaviors directed toward objects or animals were not recorded. Nor was the component of behavior which is generally thought of as "aggressiveness," i.e., behavior which involves self-assertiveness and the ability to make contacts, investigated in this study.

*Contacts* and *responses* were differentiated in the present analysis depending upon when they occurred in an interaction sequence. If, for example, a given behavior were evidenced during an observation period after interaction between two or more persons was already in progress, the behavior was designated as a *response*. However, if an affectional or aggressive behavior were employed in order to initiate interaction with another person or persons it was designated as a *contact*. Thus, if a child praised another child during a play period during which interaction between the two chil-

<sup>1</sup> This study was conducted at Oklahoma A. & M. College. Grateful acknowledgement is made for the support of the Oklahoma A. & M. College Research Foundation.

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dren was already in progress, the behavior was recorded as a response. But if a child used praise as a means of initiating interaction, it was recorded as a contact. This differentiation was made in order to determine the kinds of responses boys and girls employ in initiating contacts at various age levels.

### SUBJECTS

The subjects studied were 124 children attending the Oklahoma A. & M. College nursery-kindergarten schools. There were 13 male and 13 female two-year-olds, 22 male and 14 female three-year-olds, 17 male and 14 female four-year-olds, and 17 male and 14 female five-year-olds. Slightly over a third of the subjects were children of college students; approximately a third were children of parents whose occupations were of a professional nature, and the remaining third were children of parents whose occupations were of semi-professional, skilled, or semi-skilled nature.

### PROCEDURE

Direct observation employing predetermined categories and a time-sampling technique provided the methodology used in this study. The affectional categories were selected on the basis of a preliminary study that involved running records designed to yield suggestions for meaningful categories and from an analysis of the available categories reported in the literature. The aggressive categories were adapted from those reported in an unpublished paper by Dr. Jacob L. Gewirtz of the University of Chicago. Observation with the categories selected initially indicated need for revision and clarification. Constant revision of the instrument over a three-month period prior to the study yielded a final form consisting of 11 affectional and 18 aggressive categories.

The categories appeared on a check sheet designed to facilitate recording. All of the affectional and aggressive behaviors which occurred within a given minute were recorded by checking the appropriate category. Forty one-minute observations were made on each child, making a total of 4,960 observations of one-minute duration. The results of this study are based on these observations.

### *Categories*

The categories used in the study appear below. It will be noted that some of the categories contain more than one kind of behavior. The infrequency with which certain behavior occurred led to the grouping of certain behaviors into a single category when it seemed to the investigators that the behaviors were logically related. Brief descriptions and definitions of the categories are presented in several instances where needed to provide clarity.

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**Physical Affection:** This over-all category contains six subcategories

- a. *Compliant*, i.e., conforms to another's desire or request;
- b. *Kisses*;
- c. *Pats, Fondles, Hugs*;
- d. *Smiles, Laughs with Someone*;
- e. *Helpful, Shares*, i.e., gives assistance to another, divides materials with others;
- f. *Sympathetic*.

**Verbal Affection:** This over-all category contains five subcategories

- a. *Accepts*, i.e., receives with favor, approves;
- b. *Asks Permission, Requests*;
- c. *Speaks in Friendly Manner*, i.e., talks with another in such a manner so as to reassure, to express warm feelings for the person;
- d. *Compliments, Praises*;
- e. *Offers to Compromise, Share, Cooperate*.

**Physical Aggression:** This over-all category contains eight subcategories

- a. *Annoys, Teases, Interferes*;
- b. *Hits, Strikes*;
- c. *Competes for Status*, i.e., attempts to "show up" another by performing better;
- d. *Threatening Gesture*;
- e. *Pursues*, i.e., runs after or follows with the intent of inflicting a blow;
- f. *Snatches or Damages Property of Others*;
- g. *Negativism*, i.e., refuses to work with or conform to the directions of another;
- h. *Pushes, Pulls, Holds*.

**Verbal Aggression:** This over-all category contains ten subcategories

- a. *Commands, Demands*;
- b. *Cross-Purposes*, i.e., conflict over ways of using equipment;
- c. *Disparages*, i.e., makes remarks indicating dislike for another person, finds fault with or censures or condemns another's behavior, humiliates, laughs at another's misfortune, mocks, expresses desire that another be the victim of imperious events, attributes bad qualities to another;
- d. *Injury via Agent*, i.e., entices another person to injure a third person;
- e. *Refuses to Comply*;
- f. *Rejects*, i.e., denies activity or privilege to another;
- g. *Shifts Blame*;
- h. *Tattles*;
- i. *Claims Possession*;
- j. *Threatens*.

### *Conditions of Observation*

1. Observations were made during self-directed activity periods. No observations were made in situations in which the teacher was directing the activity, e.g., story or music periods.

2. The children were chosen for observation according to an established order. If a child was absent, an observation was made on the next child whose name appeared on the list.

3. The observer sat near the child so that any conversations could be heard easily.

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4. Not more than two observations were made on any one child during a given day, and no two observations were made on one child consecutively.

5. Each observation lasted one minute. Time was recorded by the use of a stop watch.

6. If a teacher initiated any contact with a child during the period in which the child was being observed, the data collected for the interval were discarded. The child's record sheet was placed at the bottom of the pile, and the observation was made later.

### *Reliability*

After the categories were in their final form, observations with the categories were undertaken to determine whether or not the observers could observe reliably with the categories. These preliminary observations were made for the purpose of obtaining measures of reliability and were made before the data were collected. The investigators, referred to as observers A, B, and C, made 40 one-minute observations simultaneously but independently. Twenty of the observations were made of a group of 20 children (Group I). The same procedure was followed with another group of children (Group II). The percentages of agreement obtained between the observers are presented in Table 1.

TABLE 1  
PERCENTAGES OF AGREEMENT BETWEEN OBSERVERS

Observer	Group I	Group II	Average
A with B .....	.86	.87	.865
A with C .....	.81	.83	.820
B with C .....	.87	.84	.855
Average .....	.847	.847	.847

## RESULTS AND DISCUSSION

### *Frequency of Affectional and Aggressive Responses*

The average frequencies of affectional and aggressive responses evidenced within the 40 one-minute observations of each of the 124 children are presented in Table 2. Inspection of these data indicates that, with the exception of the two-year-olds, affection was much more frequently expressed verbally than physically. At all age levels affectional responses outnumbered aggressive responses, and at the four- and five-year levels there was a tendency for the children to express their aggression verbally rather than physically.

The levels of significance of the differences between the mean number of (a) physical and verbal affectional responses, (b) physical and verbal

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TABLE 2

## MEAN NUMBER OF AFFECTIONAL AND AGGRESSIVE RESPONSES

Age (Years)	Sex	N	AFFECTIONAL RESPONSES			AGGRESSIVE RESPONSES		
			Physical	Verbal	Total	Physical	Verbal	Total
2	Boys	13	17.1	15.0	32.1	5.6	5.0	10.6
	Girls	13	18.1	17.0	35.1	3.0	1.8	4.8
3	Boys	22	18.5	28.8	47.3	7.7	7.1	14.8
	Girls	14	15.6	26.8	42.4	2.6	6.7	9.3
4	Boys	17	19.8	33.9	53.7	7.4	7.8	15.2
	Girls	14	19.4	33.4	52.8	5.0	8.1	13.1
5	Boys	17	17.8	34.5	52.3	8.0	10.8	18.8
	Girls	14	18.9	31.1	50.0	2.3	9.5	11.8

aggressive responses, and (c) total affectional and total aggressive responses are given in Table 3. A comparison of the differences in number of physical affectional responses and verbal affectional responses indicates that both the boys and girls at the three-, four-, and five-year levels evidenced a significantly greater number of verbal affectional responses. The difference in kinds of affectional responses, i.e., physical and verbal, made by the two-

TABLE 3

## SIGNIFICANCE OF DIFFERENCES BETWEEN MEAN NUMBER OF

- (1) PHYSICAL AND VERBAL AFFECTIONAL RESPONSES,  
 (2) PHYSICAL AND VERBAL AGGRESSIVE RESPONSES, AND  
 (3) TOTAL AFFECTIONAL AND TOTAL AGGRESSIVE RESPONSES\*

Age (years)	Sex	Physical Aff. Verbal Aff. p	Physical Agg. Verbal Agg. p	Total Aff. Total Agg. p
2	Boys			.001 T Af.
2	Girls			.001 T Af.
3	Boys	.001 V Af.		.001 T Af.
3	Girls	.001 V Af.	.01 V Ag.	.001 T Af.
4	Boys	.001 V Af.		.001 T Af.
4	Girls	.001 V Af.		.001 T Af.
5	Boys	.001 V Af.		.001 T Af.
5	Girls	.001 V Af.	.01 V Ag.	.001 T Af.

\* Direction of the difference is indicated by the symbol appearing at the right of the confidence levels. V Af. = verbal affection; V Ag. = verbal aggression; T Af. = total affectional responses.

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year-olds was not significant. The three-year-old girls and the five-year-old girls were more verbally aggressive than they were physically aggressive. At all age levels the total number of affectional responses exceeded the total number of aggressive responses, the differences being significant at the .001 level of confidence in every instance.

In Table 4 are presented the levels of significance of the differences between age groups in mean number of affectional responses and in mean number of aggressive responses. Although in the majority of instances

TABLE 4  
SIGNIFICANCE OF DIFFERENCES BETWEEN AGE GROUPS IN MEAN NUMBER  
OF AFFECTIONAL RESPONSES AND IN MEAN NUMBER  
OF AGGRESSIVE RESPONSES\*

Response	Sex	2-Yr-Olds 3-Yr-Olds	3-Yr-Olds 4-Yr-Olds	4-Yr-Olds 5-Yr-Olds
		p	p	p
Verbal Affection . . . .	Boys . . . .	.001 3-yr-olds	.05 4-yr-olds	
	Girls . . . .	.01 3-yr-olds		
Physical Affection . . .	Boys . . . .			
	Girls . . . .			
Total Affection . . . . .	Boys . . . .	.01 3-yr-olds		
	Girls . . . .			
Verbal Aggression . . .	Boys . . . .			
	Girls . . . .	.01 3-yr-olds		
Physical Aggression . .	Boys . . . .			
	Girls . . . .			.05 4-yr-olds
Total Aggression . . . .	Boys . . . .			
	Girls . . . .	.05 3-yr-olds		

\* Direction of the difference is indicated by the age level appearing at the right of the confidence levels.

the differences in affectional responses were not significant, the evidence indicates that (a) the three-year-old boys and girls expressed more verbal affection than did the two-year-old boys and girls, (b) the four-year-old boys expressed more verbal affection than did the three-year-old boys, and (c) the three-year-old boys made a greater number of total affectional responses than did the two-year-old boys. The three-year-old girls were more verbally aggressive than were the two-year-old girls, and the total number of aggressive responses of the three-year-old girls was significantly greater than that of the two-year-old girls. The four-year-old girls evidenced a greater number of physically aggressive responses than did the five-year-old girls.

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The general findings that aggression tends to increase with age from two years through four years, and that boys tend to respond more aggressively than girls, are consistent with reports by Beaver (2), Caille (3), Dawe (4), Green (5, 6), Hattwick (7), Jersild and Markey (8), Murphy, Murphy and Newcomb (11), and Muste and Sharp (12). The findings that girls were more affectionate than were the boys are consistent with those of Koch (9), and the relatively low incidence of aggression in relation to the non-aggressive behaviors studied is consistent with the results of Moustakas and Shalock (10).

TABLE 5  
MEAN NUMBER OF AFFECTIONAL AND AGGRESSIVE INITIATIONS

Age (years)	Initiator	RECIPIENTS OF AFFECTIONAL INITIATIONS				RECIPIENTS OF AGGRESSIVE INITIATIONS			
		Boys	Girls	Adults	Total	Boys	Girls	Adults	Total
2	Boys	2.5	.8	4.1	7.4	1.5	.8	.3	2.6
	Girls	.9	2.5	4.9	8.3	.2	.9	.1	1.2
3	Boys	6.5	2.5	5.0	14.0	2.0	1.0	.7	3.7
	Girls	4.1	4.2	6.4	14.7	1.1	1.1	.6	2.8
4	Boys	6.9	3.9	6.1	16.9	2.6	.7	.6	3.9
	Girls	3.6	4.2	3.6	11.4	1.9	1.3	.6	3.8
5	Boys	5.2	3.5	8.4	17.1	2.1	1.3	.8	4.2
	Girls	3.2	5.1	8.4	16.7	1.4	1.0	.6	3.0

#### *Frequency of Affectional and Aggressive Initiations*

The average frequencies of affectional and aggressive initiations are presented in Table 5. The data reveal that in initiating contacts the children employ affection much more frequently than aggression.

In answer to the question, "Did the boys initiate more affectional and aggressive contacts than the girls?" data presented in Table 6 indicate that at the two-year level the boys initiated significantly more affectional contacts with boys than did girls, while the girls initiated significantly more affectional contacts with girls than did the boys at this age level. At the three- and four-year levels the boys initiated significantly more affectional contacts with the boys than did the girls. At the two-year level the boys initiated significantly more aggressive contacts with boys than did the girls. The other differences obtained were not statistically significant.

An inspection of the data presented in Table 7 indicates that the initiations of the boys and girls were predominantly affectional in nature. In five

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TABLE 6

SIGNIFICANCE OF DIFFERENCES BETWEEN BOYS AND GIRLS IN MEAN  
NUMBER OF AFFECTIONAL AND AGGRESSIVE INITIATIONS\*

<i>Age</i> (years)	<i>Recipients</i>	AFFECTIONAL INITIATIONS	AGGRESSIVE INITIATIONS
		<i>Boys — Girls</i> <i>p</i>	<i>Boys — Girls</i> <i>p</i>
2	Boys	.05 <i>B</i>	.001 <i>B</i>
	Girls	.05 <i>G</i>	
	Adults		
3	Boys	.05 <i>B</i>	
	Girls		
	Adults		
4	Boys	.05 <i>B</i>	
	Girls		
	Adults		
5	Boys		
	Girls		
	Adults		

\* Direction of the difference is indicated by the symbol appearing at the right of the confidence levels. *B* = boys; *G* = girls.

TABLE 7

SIGNIFICANCE OF DIFFERENCES WITHIN AGE GROUPS BETWEEN MEAN  
NUMBER OF AFFECTIONAL AND AGGRESSIVE INITIATIONS\*

<i>Age</i> (years)	<i>Recipient</i>	INITIATIONS OF BOYS	INITIATIONS OF GIRLS
		<i>Affectional — Aggressive</i> <i>p</i>	<i>Affectional — Aggressive</i> <i>p</i>
2	Boys		
	Girls		.05 <i>Af</i>
	Adults	.01 <i>Af</i>	.001 <i>Af</i>
3	Boys	.001 <i>Af</i>	.01 <i>Af</i>
	Girls	.05 <i>Af</i>	.05 <i>Af</i>
	Adults	.001 <i>Af</i>	.001 <i>Af</i>
4	Boys	.001 <i>Af</i>	
	Girls	.001 <i>Af</i>	.001 <i>Af</i>
	Adults	.001 <i>Af</i>	.001 <i>Af</i>
5	Boys	.001 <i>Af</i>	
	Girls	.01 <i>Af</i>	.001 <i>Af</i>
	Adults	.001 <i>Af</i>	.001 <i>Af</i>

\* Direction of the difference is indicated by the symbol appearing at the right of the confidence levels. *Af* = affectional initiations.

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instances the differences obtained were not statistically significant. In four of these, however, more affectional than aggressive initiations were apparent, and in one there was no difference in frequency of initiations.

The levels of significance of the differences between age groups in mean number of affectional and aggressive initiations are presented in Table 8. A significantly greater number of affectional contacts was initiated with boys by three-year-old boys than by two-year-old boys. Too, a greater num-

TABLE 8

SIGNIFICANCE OF DIFFERENCES BETWEEN AGE GROUPS IN MEAN NUMBER OF AFFECTIONAL AND AGGRESSIVE INITIATIONS\*

<i>Initiators</i>	<i>Recipients</i>	<i>2-Yr-Olds</i> <i>3-Yr-Olds</i> <i>p</i>	<i>3-Yr-Olds</i> <i>4-Yr-Olds</i> <i>p</i>	<i>4-Yr-Olds</i> <i>5-Yr-Olds</i> <i>p</i>
A F F E C T I O N A L I N I T I A T I O N S				
Boys . . . . .	Boys . . . . .	.001 <i>3-yr-olds</i>		
	Girls . . . . .	.05 <i>3-yr-olds</i>		
	Adults . . . . .			
Girls . . . . .	Boys . . . . .	.01 <i>3-yr-olds</i>	.01 <i>3-yr-olds</i>	
	Girls . . . . .			
	Adults . . . . .			
A G G R E S S I V E I N I T I A T I O N S				
Boys . . . . .	Boys . . . . .			
	Girls . . . . .			.01 <i>5-yr-olds</i>
	Adults . . . . .			
Girls . . . . .	Boys . . . . .	.05 <i>3-yr-olds</i>		
	Girls . . . . .			
	Adults . . . . .			

\* Direction of the difference is indicated by the age level appearing at the right of the confidence levels.

ber of affectional contacts was initiated with girls by three-year-old boys than by two-year-old boys. None of the differences between three- and four-year-old boys or between four- and five-year-old boys in mean number of affectional initiations was statistically significant. The three-year-old girls, on the other hand, initiated more affectional contacts with boys than did the two- or four-year-old girls, while the three-year-old girls initiated more affectional contacts with adults than did the four-year-old girls.

A significantly greater number of aggressive initiations were made by five-year-old boys than by four-year-old boys and girls, and a significantly greater number of aggressive initiations were made by three-year-old girls than by two-year-old girls with boys. For the most part, however, the differences between age groups in terms of mean number of aggressive initiations were not significant.

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*Recipients of Affectional and Aggressive Initiations*

In answer to the question, "Who were the recipients of the affectional and aggressive initiations of the children?" data presented in Table 9 indicate that a significantly greater number of boys than girls were the recipients of affectional contacts initiated by two-year-old boys. Similarly, a significantly greater number of girls than boys were the recipients of affectional contacts initiated by two-year-old girls. Adults more often than boys were the recipients of affectional initiations of two-year-old girls, and they were also more often than girls the recipients of affectional initiations of two-year-old boys.

TABLE 9

SIGNIFICANCE OF DIFFERENCES BETWEEN THE MEAN NUMBER OF BOYS, GIRLS, AND ADULTS WHO WERE THE RECIPIENTS OF AFFECTIONAL AND AGGRESSIVE INITIATIONS\*

I N I T I A T O R S		R E C I P I E N T S		
Age (years)	Sex	Boys — Girls <i>p</i>	Boys — Adults <i>p</i>	Girls — Adults <i>p</i>
A F F E C T I O N A L C O N T A C T S				
2	Boys	.05 <i>B</i>		.01 <i>A</i>
2	Girls	.05 <i>G</i>	.001 <i>A</i>	
3	Boys	.001 <i>B</i>		.01 <i>A</i>
3	Girls			
4	Boys	.05 <i>B</i>		
4	Girls		.01 <i>B</i>	.01 <i>A</i>
5	Boys	.05 <i>B</i>	.01 <i>A</i>	.001 <i>A</i>
5	Girls	.05 <i>G</i>	.01 <i>A</i>	.05 <i>A</i>
A G G R E S S I V E C O N T A C T S				
2	Boys		.05 <i>B</i>	
2	Girls			
3	Boys	.05 <i>B</i>	.01 <i>B</i>	
3	Girls			
4	Boys	.001 <i>B</i>	.01 <i>B</i>	
4	Girls		.05 <i>B</i>	
5	Boys		.05 <i>B</i>	
5	Girls			

\*Direction of the difference is indicated by the symbol appearing at the right of the confidence levels. *B* = boys; *G* = girls; *A* = adults.

At the three-year level only two significant differences were apparent. Boys and adults more often than girls were the recipients of affectional contacts initiated by three-year-old boys. Boys more often than girls were the recipients of affectional contacts initiated by four-year-old boys. Simi-

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larly, boys more often than adults were the recipients of affectional contacts initiated by four-year-old girls. Adults more often than girls were the recipients of affectional contacts initiated by four-year-old girls.

At the five-year level a more consistent pattern appears. Boys more often than girls were the recipients of affectional contacts initiated by five-year-old boys, and girls more often than boys were the recipients of affectional contacts initiated by five-year-old girls. Adults more often than boys and girls were the recipients of affectional contacts initiated by five-year-old boys and girls.

The data in Table 9 also indicate that in every instance where the difference was significant, boys more often than girls and adults were the recipients of aggressive initiations. Boys more often than girls were the recipients of aggressive contacts initiated by three- and four-year-old boys, and boys more often than adults were the recipients of aggressive contacts initiated by four-year-old girls.

### SUMMARY

The study is concerned with the frequency with which preschool children manifest affection and aggression, the frequency with which preschool children initiate affectional and aggressive contacts, and the individuals chosen as the recipients of the contacts. Inasmuch as all of the observations were made in demonstration laboratories at Oklahoma A. and M. College, the data must necessarily be viewed as reflecting the school behavior of the subjects investigated.

The data analyzed consist of 4,960 one-minute ratings of 69 males and 55 females, 40 observations having been made on each child.

The major findings are as follows:

1. At the three-, four-, and five-year levels the children were more verbally than physically affectionate. At the two-year level the difference was not statistically significant.
2. Generally, there was little difference in the frequency with which physical and verbal aggression was evidenced.
3. Aggression tended to increase with age from two years through four years of age, and boys were more aggressive than girls.
4. At all age levels the children were more affectionate than aggressive in their response to others and more frequently employed affection than aggression in initiating contacts.
5. At the two-, three-, and four-year levels the boys initiated significantly more affectional contacts with boys than did the girls, while the two-year-old girls initiated significantly more affectional contacts with the girls than did the boys.
6. There was a tendency for the boys to choose boys or adults rather than girls as recipients of their affectional contacts.

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7. The boys were more likely to choose boys rather than adults as recipients of their aggressive initiations.

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## THE RELATIONSHIP BETWEEN "INTOLERANCE OF AMBIGUITY," GENERALIZATION AND SPEED OF PERCEPTUAL CLOSURE

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The concept of "intolerance of ambiguity" was introduced by Frenkel-Brunswick as a unifying term for a number of response characteristics of prejudiced individuals. Some of the subjects in a study of social attitudes (10) were observed to be unable to accept ambivalent feelings toward their parents or other individuals. From a series of related experiments (10) it was concluded that . . . "denial of emotional ambivalence and intolerance of cognitive ambiguity (are) but different aspects of what may be a fairly coherent characteristic. An underlying emotional conflict between glorification and hostility in the attitude toward parents, sex and one's social identity . . . is related . . . to a prevalence of premature reduction of ambiguous cognitive patterns to certainty in these subjects" (10, p. 140). A number of investigations (1, 5, 11, 14, 16) of the response characteristics of ethnocentric as compared to nonethnocentric individuals lend some support to this notion.

Theoretically, intolerance of ambiguity arises from the emotional conflicts and intensity of anxiety experienced during the socialization process. Although there is little direct evidence to support this assumption, recent investigations (18, 19) concerned with the relationship between experimentally aroused anxiety and behavioral phenomena generally associated with "intolerance of ambiguity" have provided confirmatory evidence. One experiment (19) was concerned with the consequences of stress under conditions which might be termed "psychological ambiguity"; that is, the test stimuli deviated widely from the learned expectancies of the individuals. Ss were presented with incongruous stimuli (e.g., half male—half female figure) at increasing levels of illumination until recognition of the total stimulus complex occurred. The hypothesis tested was that anxiety would increase the strength of basic or prevailing expectancies and Ss would thus require longer to recognize the incongruous stimuli. The prediction was confirmed at below the 5 per cent level of confidence. Additional support for the hypothesis was also obtained in a related study

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(18). *Ss* under conditions of stress required significantly more trials ( $p < .001$ ) to recognize an incompleted stimulus. This could be also attributed to the tendency for prerecognition responses (expectancies) to interfere with correct recognition.

In the latter study (18) the effects of the psychological stress on behavior under conditions of stimulus ambiguity were investigated. The experimental materials consisted of five complex successive-decision-making tasks. The first card of each task contained only a few elements of a picture. Additional elements were added on successive cards until the picture was completed on card 15. *Ss* were instructed to obtain the correct response on as few cards as possible. The prediction that *Ss* in the stress group would make a decision as to the nature of the stimulus on card 15 relatively early in the task series was confirmed at below the 10 per cent level of confidence.

These findings lend support to the hypothesis that behavioral phenomena generally associated with "intolerance of ambiguity" (e.g., premature cognitive closure and rigidity) are a function of anxiety arousal under particular conditions of psychological and/or stimulus ambiguity. On the basis of these results one might hypothesize that "intolerance of ambiguity" arises from learning conditions during the socialization process, where anxiety arousal was consistently associated with ambiguity of the stimulus field. That is, "ambiguity" may represent a learned anxiety cue for some individuals. If such is the case, then one would expect an association between "intolerance of ambiguity" as measured by behavior in an ambiguous task-situation and other functional properties of anxiety; e.g., rigidity (5, 9) or generalization (17) and speed of perceptual closure (15, 18). This paper reports an investigation designed to explore this hypothesis. Specifically, this investigation was concerned with the relationship between performance on a complex decision-making task, response perseveration and latency of response in a simple object-recognition task.

## METHOD

### *Subjects*

The total sample consisted of 58 junior high school students (27 females, 31 males) ranging in age from 12 to 14 years.<sup>1</sup>

### *Decision Location Task*<sup>2</sup>

The index of "intolerance of ambiguity" was one of the complex decision-making tasks which had been used in a previous investigation (1).

<sup>1</sup> The author extends appreciation to the officials and junior high school students of the Tipton, Iowa, public school system for their cooperation in this study.

<sup>2</sup> The similarity between these tasks and the Decision Location Test (11) and the Transition tests (4, 10) should be noted. For purposes of convenience the tasks used in this study are, with Dr. Levitt's kind permission, designated Decision Location Tasks-Form S (DLT-S).

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Illustrations of five such tasks are presented in that report. Each task consists of a series of 15 stimulus cards. The first card of a series has only a few elements of the stimulus picture, which, by addition of elements on successive cards, appears completed on card 15. The criterion task (A) used in this study was one in which the figure "5" appeared completed on the 15th card. A second task (B) was administered for purposes of obtaining an estimate of reliability. In this task a picture of a man with a shovel was completed on the 15th card of the series.

### *Experimental Tasks*

A test of generalization was obtained by extending the original series of 15 cards in the decision location tasks to a total of 30 stimulus cards. The stimulus cards from 16 to 30 consisted of transitional stages of the completed stimulus on card 15 to a new stimulus on card 30. On the first task series the number 5 was successively modified until the number 9 emerged on card 30. The second series of stimuli (Task B) was extended in the same way so that the man digging (card 15) became a leafless tree on card 30. The measure of generalization was the number of stimulus cards in the series from 16 to 30 that elicited the response which had been correct for card 15 (perseverative responses).

A modified form of the Street Gestalt Closure Test (20), consisting of 27 mutilated pictures representing objects or situations considered fairly familiar to all Ss, was used as the measure of speed of perceptual closure.

### *Procedure*

Each S was first administered the two DLT-S series of 30 stimuli. Prior to the administration of these tasks, a three-card sample series was given as a demonstration task. Before each task the S was given a 5 by 7 inch card on which were printed four possible correct responses for that series. The S was permitted to look at the card for 10 seconds, then it was removed from view. The instructions to the DLT-S task were as follows:

"I am going to show you a series of cards. The first card of the series always has just a few elements of a complete design on it, but each card gives you a few additional hints or clues as to what the final design or picture is going to be. Here is a sample. . . ." (Sample series of cards shown to the S and fully explained; all questions answered pertaining to the cards.)

(See Footnote 3.) "Remember there is only *one* design or picture on each card; *all the details belong to a complete design which is on the final card*. Here is a list of (numbers, etc.); one of these is the correct answer, that is, is on the final card of (this) series. You have a little time (10 seconds) to look at this card."

"Now the object of the task is to see how soon you can organize the elements of a card into the correct design or picture. You may look at each

<sup>3</sup> The remaining portion of the instructions was repeated for each additional series.

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card as long as you wish. *Remember*, the idea is to see *how few cards* you need to look at to decide what the *correct answer* should be."<sup>4</sup>

(After the first response has been made): "Now tell me, *on each card*, what you think it is going to be on the final card."

The *E* recorded the trial of first response (criterion score) and all subsequent responses in the series. The degree of generalization was measured by the number of cards in the 16 to 30 series to which the correct response to card 15 was elicited.

The Street Gestalt Test was administered following the decision location tasks. Each picture was presented to the *Ss* with the instructions to identify the picture. If the first response was incorrect, *Ss* were instructed to respond until either the correct response occurred or until a two-minute limit was reached. The latency of all responses was recorded to the nearest 1/10 of a second.

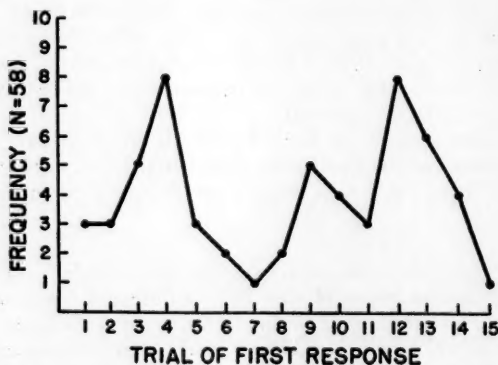


FIGURE 1—Distribution of scores for the trial of first response on Task A of the DLT-S

## RESULTS AND DISCUSSION

The distribution of scores for the trial of first response on Task A of the DLT-S is presented in Figure 1.

The bimodal form of the distribution of scores leads to some difficulty in selecting proper criterion or cutting scores for assigning individuals to a high or low intolerance of ambiguity group. Other investigators using similar tasks (4, 10, 11) have assumed that individuals who are intolerant

<sup>4</sup> The final sentence in these instructions is, of course, a crucial aspect of the task situation and in this case was intended to be ambiguous; i.e., both an early response (how few cards) and accuracy (correct answer) were stressed equally.

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TABLE 1

COMPARISON OF THE EARLY AND LATE RESPONDERS ON THE  
EXPERIMENTAL MEASURES OF GENERALIZATION AND CLOSURE

Measure	ER (Trials 1-6)	LR (Trials 12-15)	Diff.	<i>t</i>	<i>p</i>
	Mean	Mean			
Generalization*					
Task A .....	1.56	1.55	.01	.10	ns
Task B .....	1.70	1.75	.05	.29	ns
Total (A + B) .....	2.11	2.10	.01	.07	ns
Speed of Closure .....	6.00	5.67	.33	.31	ns

\* The variances of the raw scores for the measure of generalization were not homogeneous; the means and *t* tests are based on transformed data.

of ambiguity would respond relatively early in the task series. Therefore, those *Ss* falling above and below the median ( $Mdn = 8.9$ ) were compared on the measures of generalization and speed of closure. Comparison of these groups by means of *t* tests and a nonparametric test yielded no significant differences.

There is some question, however, whether the assumption underlying the use of this cutting score at the measure of intolerance of ambiguity is tenable for the conditions of this experiment. One might speculate that anxiety arousal under these "ambiguous" conditions would result in a tendency toward either impulsivity or excessive cautiousness of response (2, 18). If such were the case, the extreme responders, the very early (ER) and very late (LR), might be expected to behave similarly on the experi-

TABLE 2

COMPARISON OF THE COMBINED EARLY AND LATE RESPONDING GROUPS  
WITH THE MIDDLE RESPONDING GROUP ON THE EXPERIMENTAL  
MEASURES OF GENERALIZATION AND CLOSURE

Measure	ER+LR	MR	Diff.	<i>t</i>	<i>p</i>
	Mean	Mean			
Generalization*					
Task A .....	1.55	1.47	.08	1.54	<.20 >.10
Task B .....	1.73	1.59	.14	1.97	<.05 >.02
Total (A + B) .....	2.11	1.94	.17	2.72	<.02 >.01
Speed of Closure .....	5.83	10.69	4.86	4.43	<.01

\* The variances of the raw scores for the measure of generalization were not homogeneous; the means and *t* tests are based on transformed data.

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mental tasks; that is, to manifest more generalization and shorter latency on the recognition task than those individuals making an initial decision in the middle (MR) of the task series. As indicated in Table 1 and 2, the results of this regrouping are in general positive.<sup>5</sup>

These findings support the general line of reasoning that some individuals cannot "tolerate" the ambiguity of the stimulus field and tend to structure the stimuli prematurely (ER). The fact that the late responders (LR) behave similarly on the experimental tasks suggest that these individuals react to ambiguity, and presumably anxiety arousal, with characteristic excessive "cautiousness." Whether these individuals are also "intolerant of ambiguity" is primarily a theoretical question. That is, if "intolerance of ambiguity" refers to the tendency for ambiguity of the stimulus field to arouse anxiety, then on the basis of these results both the early and late responders might be classified as intolerant of ambiguity. In view of the *ad hoc* nature of these findings, however, considerable caution is necessary in interpreting the results. At the same time, several lines of evidence may be cited indicating anxiety is associated with the tendency to respond either early or late in the complex decisions task series.

First of all, of course, are the findings reported above with respect to the significant difference between the extreme responders as compared to the middle responders on the degree of generalization and speed of closure. Secondly, it was pointed out in the previous study (18) that without reinforcement of a particular response set (e.g., instructions to obtain the correct answer *as soon as possible*) as was the case in that study, anxiety arousal might be expected to result in either a relatively early or relatively late overt (verbal) response in the task series. This assumption was tentatively supported by the data obtained in that study. The stress group was significantly more variable ( $p = .05$ ) on the first task series and further showed a statistically significant increase ( $p < .01$ ) in the trial of first response from task 1 to task 2.

The possibility that response suppression (i.e., accuracy set) operates to delay initial decisions is also suggested by data from this study. The mean trial of correct response was 11.19. Of the 19 Ss who did not make the initial response until trial 12 or later, only 3 made an incorrect initial decision. Data to be presented in a later section of this paper indicate the relatively delayed first response was not a function of intelligence.

There is also tentative evidence that anxiety level is associated with the tendency to respond either relatively early or late in the task series. In the course of an investigation concerned with the relationship between some indices of anxiety in children, most of the subjects in this sample were administered the children's anxiety scale (6). The mean anxiety scores for the respective groups were as follows: ER, 18.89; LR, 17.81; MR, 15.03.

<sup>5</sup> To simplify computational procedures one S was randomly withdrawn from the MR group.

Comparison of the differences between these means yielded near significant  $t$  ratios for the comparison of the ER and MR groups ( $t = 1.83$ ;  $df = 35$ ;  $.10 > p > .05$ ) and the LR and MR groups ( $t = 1.59$ ;  $df = 32$ ;  $.20 > p > .10$ ).<sup>6</sup> Therefore, it would seem plausible to assume that characteristic reactions to anxiety (e.g. impulsivity and cautiousness) evoked by the ambiguity of the stimulus field are important determiners of performance on the decision location tasks.

The fact that performance on these tasks is sensitive to "set" factors (18), however, indicates that relatively early and late decisions may be a joint function of anxiety level and "set" (7) rather than the tendency for stimulus ambiguity to arouse anxiety in those individuals who fall in the extreme groups. A replication of this experiment, with both individually- and group-administered tests, with a preselected sample of high and low anxiety subjects is now being conducted. The additional data should provide more definite answers to the questions posed above.

#### *Reliability of the DLT-S Task*

The reliability of the DLT-S as an index of the tendency for ambiguous situations to arouse anxiety is difficult to determine since the usual methods of obtaining reliability do not apply strictly. The best estimate would seem to be derived from the correlation between alternate forms of the task. However, the two tasks used in this study have not been demonstrated to be equated along relevant dimensions. Further, it is known that performance on the second task is partly determined by the  $S$ 's performance on the first task (11, 18). Therefore, the correlations reported should be considered only crude estimates of the task's reliability.

The correlation between Task 1 and Task 2 for the control group ( $N = 40$ ) in the original experiment (18) was  $+.38$ .<sup>7</sup> The same correlation for the total sample in this study ( $N = 58$ ) was  $+.59$ . Levitt (11) obtained a correlation of  $+.66$  for the two forms of the DLT test used in that investigation. The latter correlations are all statistically significant beyond the .01 level of confidence. Although the relationships are not as high as might be desired, considering the nature of the task, they are high enough to warrant further investigations with the tasks.

#### *Intelligence and Performance on the Criterion and Experimental Tasks*

California Test of Mental Maturity (CTMM) scores were available for all  $S$ s participating in this study. The total group obtained a mean IQ

<sup>6</sup> The distribution of CAS scores for the 7th graders was comparable to that obtained with the standardization group (6). Since most of the  $S$ s in this sample scored in the middle range of that distribution, it might be expected that preselecting  $S$ s from the extremes would result in higher relationships between anxiety level and performance on the DLT-S.

<sup>7</sup> This correlation is considerably attenuated since it is based on data obtained on five different tasks appearing randomly in the first and second positions.

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of 104.63 with a standard deviation of 17.96. The means for the HIA-E, HIA-L, and LIA groups were 104.00, 103.95, and 105.95 respectively. None of the differences between the groups was significant.

Product-moment correlation coefficients were computed between CTMM scores and performance scores on the criterion and experimental tasks in order to determine to what extent the obtained results might be attributed to intelligence. The CTMM correlated  $-.03$  with the trial of first response and  $+.39$  with the trial of correct response on the DLT-S. The obtained correlations between the CTMM and response perseveration and latency were  $+.02$  and  $-.10$  respectively. The only statistically significant correlation was that between the measure of intelligence and the trial of correct response ( $+.39$ ) which is significant beyond the 1 per cent level of confidence. These data indicate that the relationships obtained between the DLT-S and measures of generalization and speed of closure cannot be attributed to intelligence.

## CONCLUSIONS

The findings of this study are, of course, based on a relatively small number of subjects. Considerably more information concerning the determinants and correlates of performance on the decision location task will be necessary before definite conclusions may be drawn. Within these limitations, however, it would seem warranted to state the following general and tentative conclusions.

The finding that "early" and "late" responders on the decision location task behave similarly with respect to the measures of generalization and speed of closure is consistent with the hypothesis that anxiety is one determinant of the behavioral correlates of "intolerance of ambiguity." By indirection, the results also suggest that anxiety arousal may, for some individuals, be a concomitant of "ambiguity" in the stimulus field (8, 12).

Whether the performance of the early and late deciders was some function of the relationship between anxiety and set (instructions) or due to characteristic reactions to anxiety arousal in ambiguous situations (3, 5, 8) is a question only further research can answer. However, the results reported here, as well as recent investigations concerned with the effect of characteristic reactions to anxiety on learning (13) and behavior in "ambiguous situations" (2, 3, 8, 12), would seem to make the latter interpretation a plausible one. Block and Peterson (2), for example, in a study of some of the personality correlates of decision time, report stable adjudged trait differences between "fast" and "slow" deciders along several selected personality dimensions. Further research should reveal whether characteristic early and late decision-making on these more complex tasks is related to such personality dimensions as impulsivity-compulsivity, confidence, assertiveness, etc. Particularly important also is a better understanding of the

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learning conditions during the socialization process which contribute to the development of particular characteristic reactions to anxiety.

### SUMMARY

A sample of 58 junior high school students were individually administered a decision location task, a measure of response perseveration and a recognition test for mutilated pictures (closure). Individuals who tended to make initial decisions relatively early or relatively late were compared with those who made these decisions nearer the mean trial of initial decision for the total sample. Analysis of these data yielded no statistically significant difference between the "early" and "late" responders on the degree of response perseveration or latency of response on an object recognition task. These two groups were then compared with the group which tended to make initial decisions in the middle portion of the task series. Analysis of the data indicated that both the early and late responders manifested significantly more response perseveration and shorter latency of response on the recognition task than the middle group. The magnitude of the correlations between intelligence test scores and the experimental measures indicated these results could not be attributed to intelligence. The findings were interpreted as lending additional support to the hypothesis that anxiety is an important determinant on "intolerance of ambiguity."

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## CHILD BEHAVIOR AND THE EMPATHIC COMPLEX

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This article seeks to propose, within the necessary spatial limitations, a concept for use in the study of child behavior, and some comments concerning its application.

### THE CONCEPT DEFINED

The concept is that of the empathic complex. Its central core is the term *empathy*, the dictionary definition of which is "the ascription of our emotional feelings to the external object which serves as their visual and auditory stimulus" (Funk and Wagnalls, 1951). It was the late Harry Stack Sullivan who sparked the term into use in connection with the study of human behavior. "Empathy," he wrote, "is the term that we use to refer to the peculiar emotional linkage that subtends the relationship of the infant with other significant people" (10, p. 8) [Consult also (11) and (5).] The term *complex* is used to convey the idea of a system or assemblage of particulars like, for example, the B complex in vitamins. We are using the term *empathic complex*, then, to mean the particular emotional linkage between a child and the significant persons in his environment.

Sullivan primarily utilized the term *empathy* in connection with the subtle process whereby certain emotional states, like anxiety, are transferred from mother to infant, but he did recognize that as the child grew older he came to perceive through this same emotional linkage more overt manifestations in regard to behavior. In fact, he sensed the role of this emotional linkage throughout the life of the individual. "We do not know much about the fate of empathy," he wrote, "in the developmental history of people in general. There are indications that it endures throughout life, at least in some people" (10, p. 8).

The concept of the empathic complex is presented here as applying particularly to the years from early childhood to adolescence, after which the pulls of the child's peers manifest themselves with relative strength.

### THE THEORY OF THE EMPATHIC COMPLEX

Our theory of the empathic complex will be presented briefly in three parts.

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1. As the child grows out of infancy and his more or less exclusive contact with the mother, he develops close relations with a selected few older persons. Some of these are members of his immediate family; some, of his kinship group; still others are selected from family contacts, such as guests, servants, and the like. Data presented later in this article suggest the possible number and range of such persons.

2. These persons are selected by the child, within the limitations that his situation imposes. In doing so, he considers primarily the total personality of these "other persons," and only secondarily the details of his relations with them, i.e., their methods of child rearing. Behrens (1), in a highly significant study, has shown this in the case of the mother. "The study indicates that evaluations of child rearing practices are of little value unless understood as aspects of a dynamic process of socialization dependent on the social interaction of those individuals concerned" (p. 225). The results of this study show that "the child's adjustment to socialization was significantly related to the 'total mother person' and specifically to her character structure, but insignificantly related to the mother's specific rearing techniques" (p. 237).

In selecting "total persons," the child does so on the basis of his needs of them, and not as they are viewed by other persons. For example, a quiet, serious, hard-working father, whom adults characterized as a good father, a good husband, and a good provider, appeared to the child as a cold and forbidding total person. In another case, an impressive-looking, vigorous lawyer, coming to the home to visit, impresses a lonely, day-dreaming boy with the way other persons kow-tow to him.<sup>1</sup>

Above all, and pervading all, influencing the child's selection is the emotional rapport which develops between him and these "other persons." And this, be it emphasized, is a two-way relationship. Children, because of their dependence, want to be loved, to be recognized for themselves, but they also want to love in return. Years ago, Charles Dickens expressed this latter factor, so often overlooked, we believe, in contemporary studies. In *Great Expectations*, Pip, who had been reared by Mr. and Mrs. Joe, has just been freed of the guilt for having stolen Mrs. Joe's pie. "I do not recall," he says, "that I felt any tenderness of conscience in reference to Mrs. Joe. But I loved Joe—perhaps for no better reason in those early days than because the dear fellow let me love him" (6).<sup>2</sup>

3. These "other persons," or empathic complex, become the primary factors in the child's behavioral development, and for three main reasons.

(a) They serve as the polar points around which the details of child rearing are organized. The theory of the empathic complex is not meant to ignore or to depreciate the constant repetitive processes that go on in the child's life, the multitude of continuing details of family life and habits

<sup>1</sup> From the files of the William T. Carter Foundation.

<sup>2</sup> See introductory statement by Earle Davis, p. iv.

of child rearing, but to add to their consideration the idea that there are polar points, highly magnetized as it were, around which they tend to swirl and become organized.

(b) They become the motivating forces which strengthen or weaken the methods of child rearing. The child decides that he wants to be like one or more of these other persons, and, to become so, will respond cooperatively to certain aspects of his rearing. Or, he will think, as a young person said to us recently, "the key to my behavior is the strong desire not to be like my older sister."

(c) They serve as the mediating agents between the child and his environment. Zimmerman and Broderick (13) have shown how family friends serve this purpose with families as a whole. Our theory contends that a similar function is served by his empathic complex for the child. [For a general discussion of the role of the home as an experience defining and evaluating agency, see Bossard (2, p. 433).]

It should be made very clear that the thesis advanced in this article is supplementary and not opposed to the cultural study of patterns of child rearing and development. Each culture and subculture has its distinctive modes of child rearing and personality formation. Our thesis suggests that, within the cultural configuration of the area and the family, it is the empathic complex which accounts for the selective aspects of the individual child's behavioral development, thus explaining the wide variations that obtain within a seemingly common background. Simply stated, what we are proposing for the study of behavior is that it is people, and not methods of child rearing, that are significant in explaining the differentials within a culture or subculture. It is on this basis, too, that the negative findings of Sewell and his associates may be explained (7, 8, 9).

#### SOME SUGGESTIVE LINES OF EVIDENCE

In support of the thesis which we have advanced, we submit four lines of evidence, selected from our studies in the sociology of child behavior.

1. *Autobiographical material.* In the analysis of autobiographies, which we have used extensively in our work (2, Chapters XI, XII, and XIV; 3; 4), we have found that almost without exception the authors explain their own development in terms of a relatively few persons toward whom they developed marked feelings of like or dislike when quite young. The number of such persons usually is limited, ranging from two to perhaps as many as seven. As a recent example of such writing by a distinguished author, there is the analysis made by Arnold Toynbee (12), the historian. He identifies the following major influences in his early formative years: (a) mother, (b) great uncle, (c) uncle, (d) a tutor, and (e) selected books, chiefly of a historical nature.

2. In a collection of three hundred life-history documents which we are preparing for publication, we find, virtually without exception, that in

*randomly picked?*

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writing of the factors believed to influence the behavior of the writers the references are to a selected few persons, and that the clearest and fullest descriptions are in terms of the personalities and values of these persons. It is also evident, in this material, that the writers have strong emotional attitudes toward these persons, either of appreciation or of aversion, so that the persons referred to, and their character structures, stand out as vivid impressions in their experience history.

3. In one of the tests of our theory, we sought to ascertain how many such persons were confined to the family group of a given number of persons. Accordingly, we asked a total of 150 persons to (a) list all persons in their immediate family, (b) all persons in their paternal kinsfolk's group, (c) all persons in the maternal kinsfolk's group, and (d) to indicate all those with whom they had close emotional ties (those they liked very much), those toward whom they had opposite feelings (disliked very much), and those toward whom they had neutral feelings. Sixty of these were undergraduate students in a large eastern university, and 90 were members of an evening adult education group. Table 1 represents the answers in summary form.

TABLE 1  
EMPATHIC COMPLEX DATA  
150 Cases — 41 Males, 109 Females

<i>Immediate Family</i>	<i>Males (41)</i>		<i>Females (109)</i>		<i>Total</i>	<i>Per Cent</i>
<i>Total Im. Contact</i> . . . . .	154	100.0	499	100.0	653	100.0
Close . . . . .	109	70.8	401	80.4	510	78.1
Not . . . . .	28	18.2	51	10.2	79	12.1
Neutral . . . . .	17	11.0	47	9.4	64	9.8
<i>Total Paternal Kinsfolk</i> . . . . .	442	100.0	899	100.0	1341	100.0
Close . . . . .	195	44.1	379	42.2	574	42.8
Not . . . . .	43	9.7	92	10.2	135	10.1
Neutral . . . . .	204	46.1	428	47.6	632	47.1
<i>Total Maternal</i> . . . . .	408	100.0	1045	100.0	1453	100.0
Close . . . . .	157	38.5	403	38.6	560	38.5
Not . . . . .	52	12.7	123	11.8	175	12.0
Neutral . . . . .	199	48.8	519	49.6	718	49.4

It will be noted that the average number of persons in the immediate background that elicited positive (not neutral) responses was approximately four per person; of the paternal kinsfolk it was about the same, and only fractionally higher for the maternal kinsfolk group. Clearly, the emotional responses to the members of the family group are limited in number and highly selective.

In our detailed analysis of this material, there are some marked variations on the basis of the size of the several family units, the physical nearness to one or both kinship groups, and relationships between groups on the basis of past history. On the whole, however, most replies fell within a range of three to five persons in each of the three groups, including both those actively liked or disliked.

4. Another experimental study made with 38 advanced university students in the field of human behavior is presented in summary form. They were asked: (1) to identify the chief influences which conditioned their own behavior up to the fifteenth year; (2) if these were persons, to write out brief characterizations of such persons. Care was taken to explain that attitudes of hate or aversion might be significant, as well as love, admiration, or respect. Finally, thumb-nail characterizations of the 38 persons who contributed such information were obtained.

The number of cases is, of course, too small to have anything but suggestive value. It is with this acknowledgment that selected aspects of this material are presented.

1. The influences identified by all 38 cases center around persons: persons they liked and persons they disliked.
2. It is equally clear that all had pronounced emotional attitudes toward these persons.
3. The number of such persons identified ranged from three to eight. The most frequent numbers were five (eight cases) and six (eighteen cases).
4. The person mentioned most frequently was the mother, also the most emphasized. Father and other sibling followed in that order.
5. Kinsfolk mentioned, in order of frequency, are aunts (usually maternal aunts), grandparents, uncles, sister-in-law.
6. Other persons, in order of frequency, were nurse (governess, Negro mammy), teacher (in kindergarten or primary grades), guest, neighborhood personage.

Finally, we compared the characterizations of the influencing persons, as given by those cooperating in the study, with the thumb-nail characterizations given to us of those cooperating. The results here are striking. In 34 out of 38 cases, the sketches of those cooperating identified, wholly or largely, the traits and values mentioned by the cooperators, as existing in the persons whom they mentioned as major influences in their lives. Our studies here are too limited in number and, as yet, not developed sufficiently in method, to merit more than mention as an area for future investigation.

In summary, each of these studies, however limited in number of cases and superficial in character, suggests that adults who analyze the outstanding influences in their earlier behavioral development emphasize

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a selected few persons whom they contacted in those early years: toward whom they developed strong emotional attitudes; who came to personify certain traits, values, habits, occupations, and behavior patterns; and whom they more or less consciously sought to emulate or, in the case of feelings of aversion, develop opposing traits, etc. On the basis of these contacts, the boy or girl reacts toward the methods of child rearing that constitute his or her experience, and evaluates other conditioning factors encountered.

## SUMMARY

This paper is presented purely for suggestive purposes. It is our hope that other students, especially of the sociology of child behavior, will test our concept of the empathic complex and the role of the outstanding emotionalized contacts of the child as the polar points and motive forces in the development of the child's behavior.

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## TEN-YEAR-OLD BOYS IN TROUBLE

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This study is an effort to trace further the influence of developmental stage on delinquency. Although there may be no sharp division based on age, nevertheless, many writers on the subject state that concurrent with pubescence most youngsters begin to show behavior patterns different from those of any earlier age. To this circumpubescent period has been given the name "preadolescence."

In their compilation of the rather small amount of research evidence on this period, Blair and Burton (1) agree with Redl (3) that, as compared with younger children, the preadolescents display more ambivalence toward their parents, more readiness to be resistant to adults, and a more intense devotion to peer groups. Looking at the matter from the opposite viewpoint, boys below the age of pubescent changes should show a greater dependence upon their parents, a greater docility toward adults, and weak ties to peer groups.

According to the findings of the Harvard Growth Study (2), pubescence is rare among ten-year-old boys. Indeed, in their sample of 747 public school boys, none had completed his preadolescent growth spurt before 11.5 years of age. This would indicate that very few would have entered that growth period at the age of ten. Therefore, a group composed of ten-year-old boys would be heavily saturated with "children" as opposed to "preadolescents" and "adolescents."

If one were to accept Redl's formulation of the characteristics of preadolescents, a group of "children" boys would show less open ambivalence to their parents, because of less open rebellion, than would be true of older boys. They would also show a weaker set of ties to the peer group, which would loom less importantly in their lives.

In a previous study by Wattenberg and Quiroz (6) it had been noted that among ten-year-olds who were contacted on complaint by the Youth Bureau of the Detroit Police Department few continued in patterns of delinquency. Of a total of 207 ten-year-olds with police records in 1948, a follow-up found only 43 had police contacts in 1950. This could be taken to indicate that their original offenses were of a nonprognostic, episodic nature rather than expressions of markedly deviant personality structures.

On the assumption that a group of ten-year-olds would show more "childish" characteristics it seemed worth while to test the hypothesis that even among boys with police records ten-year-olds would differ from older lads in expressing less antagonism to parents and having less sturdy relationships with their peers.

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### PROCEDURE

As part of its procedure in dealing with boys charged with offenses, the Youth Bureau of the Detroit Police Department requires its officers to fill out a "history sheet," recording a wide variety of information on each boy contacted on complaint. In a series of studies it had been found that this information had predictive value.

The "history sheets" for the group of ten-year-olds used in the Wattenberg and Quiroz study (6) previously mentioned were obtained. The sheets for all older boys picked up by the police in that same year were used as a comparison. In all, there were 207 ten-year-olds and 3,663 older boys. For each item appearing on the history sheets, a tabulation was prepared and tested for statistical significance of differences by the chi square test.

### FINDINGS

Of the 46 tabulations tested, the null hypothesis could be rejected at the .01 level of confidence in 14; and at the .05 level of confidence in three more. The total number at the .01 level was 14 times chance expectation; at the .05 level 7.4 times. There is clearly a series of real differences between the ten-year-olds and all older boys. Table 1 sets forth these differences.

TABLE 1  
DIFFERENCES BETWEEN TEN-YEAR-OLDS AND ALL OLDER BOYS  
INTERVIEWED ON COMPLAINT BY DETROIT POLICE, 1948

<i>Subject of Tabulation</i>	<i>Category in Which Ten-Year-Olds Were High</i>	<i>Level of Confidence</i>
Physical development .....	"Small for age" .....	.01
Sexual development .....	Preadolescent .....	.01
Favorite sport .....	Baseball .....	.01
Attitude toward school .....	Likes .....	.01
Attitude toward teacher .....	Friendly .....	.01
Attitude toward classmates .....	Quarrels .....	.01
Grades in school .....	Average .....	.01
Paid employment .....	None .....	.01
Disposition of money .....	For entertainment .....	.01
Place of employment .....	Not employed .....	.01
Attitude toward neighbors .....	Spiteful .....	.01
Size of home .....	Less than one-third room per person .....	.05
Racial composition of neighborhood ..	Racially same .....	.02
Parents' income .....	Regular, but low .....	.02
Marital status of parents .....	Home intact .....	.01
The family car .....	Boy not allowed to drive .....	.01
Money from parents .....	Given on request or as allowance ..	.01

It will be noted immediately that several of the statistically significant differences are of a nature that would be expected as a matter of course in any comparison of ten-year-olds with other boys. These include: sexual development, paid employment, place of employment, and use of the family car.

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Pointing to more basic life situations or personality attributes are such differences as the indications that the ten-year-olds are more dependent upon their parents for money, the evidences of relative poverty, and the pattern of attitudes toward school and adult neighbors.

The attitudes toward school would appear to confirm the hypothesis which this study was made to test. The ten-year-olds express favorable attitudes toward school and teachers. There is no way of knowing whether this expression represents a genuine attitude or is mere lip-service. However, more of them quarrel with classmates. Also tending to confirm the hypothesis is the fact that, although differences failed to reach statistically conclusive levels, somewhat more ten-year-olds expressed liking for their homes and for both parents; fewer belonged to organized youth groups or to either gangs or other strong peer groups.

The significance of the greater spitefulness against adult neighbors is not clear. It could be that neighborhood feuds were responsible for bringing the police into the picture for these boys. It is also possible that the adult neighbors were targets for hostility displaced from the yet hard-to-challenge parents or teachers. All this, however, is sheer speculation. The facts needed to give clear meaning are not available.

The relative poverty of these boys as compared to older ones points to possible exposure to more examples of delinquency in older peer groups present in their neighborhoods. Generally speaking, in larger cities low income and overcrowded housing are found in areas where delinquency rates are high.

An unanticipated finding was the one indicating that homes were more likely to be intact for the ten-year-olds. Linked to this on the basis of a previous study (5) is the tendency for these boys to come from racially homogeneous areas. It has been noted that residence in racially mixed neighborhoods predicted repeating among boys who got in trouble although not members of gangs and who come from tense homes.

## DISCUSSION

It is interesting to compare the results of this study with those of a previous study (4) in which eleven-year-old boys in trouble with the police were compared with all older boys in the same situation. The findings of both studies agree in finding the younger group more frequently falling in the following categories:

1. Small for age
2. Preadolescent
3. Likes school
4. Friendly to teachers
5. No paid employment
6. Spends money on entertainment

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7. High ratio of people to rooms in dwelling unit
8. Home intact
9. Money given by parents as allowance or on request
10. Baseball as favorite sport
11. Does not drive the family car.

The ten-year-olds were different in that, as compared to older boys, they were more likely than eleven-year-olds to quarrel with classmates, get average grades in school, display a spiteful attitude toward adult neighbors, live in racially homogeneous neighborhoods and come from homes where the parental income was regular but low.

The eleven-year-olds, on the other hand, as compared with older boys were more likely to live in substandard dwellings, have working mothers, express hostile feelings against one or both parents, belong to a gang, and have fewer quarrels with classmates.

To the extent that these comparisons bear upon the hypothesis, they tend to support it. As compared to a group more highly saturated with "preadolescents" as distinguished from "children," fewer ten-year-olds expressed hostility to parents or gave evidence of strong peer group ties; fewer of them were in gangs and more quarreled with classmates.

## SUMMARY

A comparison was made of data relating to 207 ten-year-olds and 3,663 older boys interviewed on complaint by the Youth Bureau of the Detroit Police Department. As contrasted with comparisons of similar nature involving groups having more "preadolescents" this one indicated that fewer ten-year-olds expressed hostility to parents and had strong peer group ties.

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## PATTERNS OF REINFORCEMENT AND RESISTANCE TO EXTINCTION IN YOUNG CHILDREN<sup>1</sup>

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Intermittant reinforcement, varying patterns of reinforcement during training, has been the concern of many experimental studies with animals since the results are said to have bearing on significant theoretical issues in behavior theory (14). Aside from theoretical considerations, cumulated data indicate that within limits, types of training schedule is one of the conditions covarying with resistance to extinction, i.e., the number of responses emitted during a period of nonreinforcement. More specifically, results have established, for the most part, that intermittent reinforcement (whether fixed or irregular in pattern) markedly increases resistance to extinction as compared to continuous reinforcement (2, 10, 11). Our interest, at this stage of laboratory research on child behavior, is to study this relationship in young children.

In discussing this and related studies, it may be helpful to offer at the outset some clarification of the terms most frequently employed in investigations of this sort. Our definitions are similar to Skinner's (17, 18).

1. By *continuous reinforcement* we mean that in the experimentally defined situation a response has been reinforced on each occasion of its occurrence.
2. By *intermittent reinforcement* we mean that a reinforced occurrence of a response has been preceded or succeeded on at least one occasion by an unreinforced occurrence of the response. No differentiation is made among the terms descriptive of this procedure; namely, intermittent reinforcement, partial reinforcement and periodic reconditioning.
3. By *interval intermittent reinforcement* we mean that the pattern of a reinforcement is controlled by temporal events in the external environment; and by *ratio intermittent reinforcement*, we mean that it is dependent on the subject's behavior.
4. By *fixed and variable patterns of intermittent reinforcement* we refer to the relationship between the reinforced and nonreinforced responses. Interval and ratio may, of course, be either fixed or variable in pattern.

During the past 10 years there has been a growing interest in intermittent reinforcement with children, as shown by the publication of six

<sup>1</sup> The author wishes to express deep appreciation to the Agnes Anderson Foundation and the Graduate School of the University of Washington for financial support, and to Mrs. Ruth R. Crayne for her services as research assistant.

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investigations. Five studies have approached the problem by keeping number of training trials constant and varying number of reinforcements. Three of these experiments (3, 9, 12) had training patterns on variable ratios; two (6, 7) on fixed ratios. Although there were differences in the ages of the subjects, intelligence levels, types of reinforcers, number of trials and number of reinforcements, all but one (6) found that intermittent reinforcement procedures more resistance to extinction.

The other study (15) treated the problem by holding the number of reinforcements constant and varying the number of trials. Using trinkets for rewards, Pumroy gave three reinforcers under each of four conditions of training according to percentage of trials reinforced; i.e., 3 trinkets for 3 responses (100%); 3 trinkets for 6 responses (50%); 3 trinkets for 9 responses (33 1/3%); and 3 trinkets for 18 responses (16 2/3%). The four schedules were given in a single session with order of presentation varied on a random basis. Furthermore, the schedules were interspersed with two-minute intervals of nonreinforcement to obtain measures of resistance to extinction. Under these conditions, number of responses during extinction increased with percentage of reinforcement, and the 100% schedule showed more resistance to extinction than the 16 2/3% schedule.

### PROBLEM

Our objective was to study further intermittent reinforcement with reinforcements held constant using a larger number of reinforcers and observing behavior under two types of schedules given to subjects in equated groups.

The specific problem may be stated as a question: For a given number of reinforcements, is there a difference in the extinctive behavior of two groups of preschool children when the training of one group is on a continuous reinforcement pattern, and the training of the other group is on a variable intermittent schedule with reinforcement following 20 per cent of the responses?

Information bearing on this question was derived from two experiments. Experiment I was a preliminary investigation.

### EXPERIMENT I

#### *Subjects*

Eighteen preschool children from the Nursery School of the Institute of Child Development, University of Washington, served as subjects. The school is conducted on a three-hour day, five-days-a-week basis. There were 8 boys and 10 girls ranging in age from 39 to 60 months. They came from families with fathers classifiable in the upper three occupational groups according to the Minnesota Scale for Occupational Rating (8, 19). The percentages are as follows: I, Professional, 65.6; II, Semiprofessional and managerial, 18.7; III, Clerical, skilled trades and retail business, 15.7.

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Socioeconomic status of the children's families was also estimated by the Barr Scale Rating of Occupational Status (19). The mean rating for fathers' occupations was 15.17, which is 6.29 scale points above the mean for adult males in the general population.

Although not all the subjects had been given intelligence tests, the mean IQ of the group was estimated from Stanford-Binet scores of children attending the nursery school during the past three years. On this basis the mean IQ of the subjects is estimated to be about 116.

### *Apparatus*

The situation designed to produce and record the essential behavior has been described in detail (1). Salient features of the apparatus consist of: (a) a response arrangement in the form of a wooden box with two holes, one above the other—the lower one to present a small rubber ball to the child and the upper one to receive it in making a response; (b) a device for delaying the return of the ball; (c) a motor-driven machine to dispense plastic trinkets<sup>2</sup>; (d) a clear plastic box for catching the trinkets; and (e) an ink-writing marker for recording responses and reinforcements.

### *Procedure*

The 18 children were divided into two groups matched for age and previous experience in experimental situations. The mean age for Group A<sub>1</sub> (those to receive continuous reinforcement training) was 49.4 months, while the mean age for Group B<sub>1</sub> (those to have 20 per cent intermittent reinforcement training) was 48.4 months.

Prior to participating in the experiment, each child was "prepared" in a standardized manner. First, the experimenter, a young woman wearing an attractively colored smock, makes herself known to the children by watching them at play in the school yards and rooms. After a few days the children begin to regard her as a member of the teaching staff. Second, when a child is selected to serve as subject, the "teacher" invites him to come and "play with some toys." On entering the laboratory, she suggests that he sit in front of a table upon which are a plastic dog and small tin dog house. The experimenter then demonstrates how the toy works. She puts the dog in the house and shows that tapping on the table will cause the dog to shoot out. She demonstrates also that the dog pops out when called loudly by his name, "Sparky." The child is then encouraged "to make the dog come out." Once he takes charge of the toy, play is permitted until he has made the dog come out at least four times. A delay of 15 seconds between insertion and pop-out is the criterion for termination. Third, immediately after the termination of warm-up activity, the experimenter invites him to come to another table upon which the apparatus stands. When he is settled in the chair before the apparatus, a plywood screen is raised and the ex-

<sup>2</sup> Trinkets were purchased from the Viking Company, 530 Golden Gate Avenue, San Francisco 2, California.

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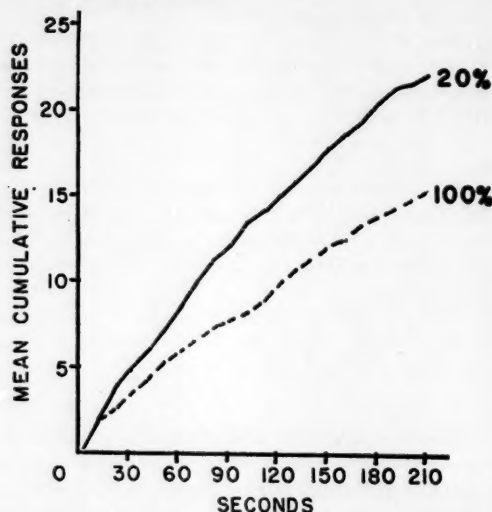
EXP. I  
EXTINCTION

FIGURE 1—Mean cumulative responses during the three-and-a-half minute extinction period for the two groups in Experiment I.

perimenter proceeds with the instructions. She shows a handful of trinkets and says: "You can get some of these to keep, to take home with you." She hands the child the ball and says: "When you put the ball in there (pointing to the upper opening) some of these toys will come down here (pointing to the covered plastic box). The ball will come out here again. You can put it back into the top hole as many times as you like. We will leave all the toys that come down in the box until we are finished, and are ready to go." The experimenter takes a seat six feet to the rear of the subject and offers no further suggestions or instructions.

Comments and questions directed to the experimenter are reacted to in a pleasant nondirective fashion, e.g., "You think the thing is broken." "You think no more will come out." When the session is over, and the receiving box is opened, the trinkets are given to the child, and he is returned to his group.

Children in Group A<sub>1</sub> were given six trinket reinforcements in consecutive order followed immediately by a period of three-and-a-half minutes of no reinforcement. On the other hand, those in Group B<sub>1</sub> were given six reinforcements distributed over 30 responses with trinkets delivered

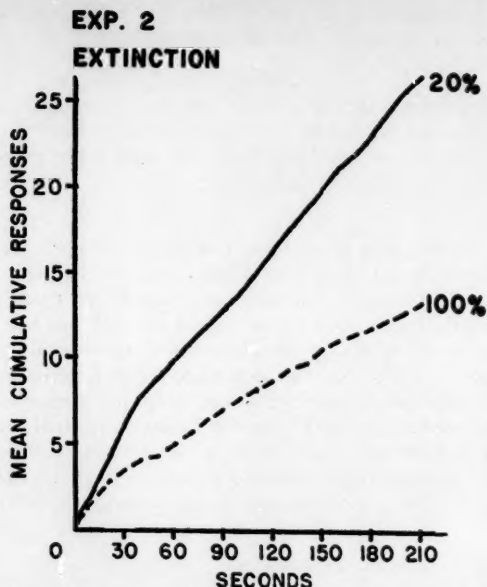


FIGURE 2—Mean cumulative responses during the three-and-a-half minute extinction period for the two groups in Experiment II.

on trials 1, 6, 13, 17, 23, and 30. The apparatus was adjusted so that (a) the minimum time between responses during training and extinction was 3.3 seconds, and (b) each response during training, whether reinforced or not, was followed by a one-second motor hum from the trinket dispenser.

#### Results

Results, in terms of the number of responses emitted during the three-and-a-half minute extinction period, are shown in Figure 1. The mean number of response for the 20 per cent group is 22.0; the mean for the 100 per cent group is 15.3. The difference of 6.7 responses is statistically significant between the 5 and 10 per cent levels of confidence.

#### EXPERIMENT II

##### Subjects

In this experiment, the subjects were 21 preschool children, 13 boys and 8 girls, from the Nursery School of the Institute of Child Development, none of whom had participated in Experiment I. They ranged in age from 32 to 55 months and like the children in the previous groups, had fathers

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in the upper categories of occupations. Also, it is highly probable that the mean IQ of this group was about the same—116.

### *Apparatus*

The apparatus was the one used in Experiment I, with one significant alteration. The trinket dispenser motor sound was *accentuated by a buzzer*. Duration of the buzzer sound was exactly the same as the motor hum in Experiment I.

### *Procedure*

The 21 children were divided into two groups. Group A<sub>2</sub> (continuous reinforcement training) consisted of 9 boys and 4 girls having a mean age of 44.1 months. Group B<sub>2</sub> (intermittent reinforcement training) had 4 boys and 4 girls with a mean age of 45.6 months. All had had a limited and equivalent amount of experience in previous experimental situations.

The preparation procedure was identical to that in Experiment I. Training and extinction procedures were similar, except that five rather than six trinkets were used as rewards. Children in Group A<sub>2</sub> received five consecutive trinket reinforcements while those in Group B<sub>2</sub> received five distributed over 25 responses in the following pattern: 1, 6, 13, 17, and 25. The buzzer sound followed each response during training whether reinforced or not.

### *Results*

Analyses of the data show that Group B<sub>2</sub> gave more responses than Group A<sub>2</sub> during extinction. Figure 2 shows these results in graphic form. Mean number of responses for Group B<sub>2</sub> is 26.2 and for Group A<sub>2</sub> is 13.0. The difference of 13.2 is statistically reliable at the 1.5 per cent level of confidence.

## DISCUSSION

Findings from both studies indicate that under the experimental conditions described, for a given number of reinforcements a variable ratio intermittent distribution is associated with more resistance to extinction than a continuous schedule. The fact that the difference in Experiment II is reliable at a higher level of confidence than that in Experiment I suggests that the increased distinctiveness of the auditory stimulus served as a stronger conditioned reinforcer.

Our results are consistent with findings from many studies with infra-human subjects in which reinforcements are held constant, and they are similar to the results of most child studies in which number of trials are controlled. They are in contrast to the findings of Pumroy (15) which were briefly described in the early part of this paper. Since the two studies had markedly different experimental designs, it is difficult to determine which conditions were influential in producing a reversed relationship. One aspect of Pumroy's study suggesting further analysis is the consequences of dis-

persing, in a single session, blocks of intermittent reinforcement with short periods of extinction. It would seem that large blocks of training might produce different results than short blocks, and that intervals between training blocks might be more influential in the earlier versus the later phases of training.

The present study provides information that should make it profitable to go on to investigate with groups of children intermittent schedules and their interrelationships. Investigators working with animals have offered some provocative leads. Their suggestions include an analysis of the definition of the response unit (13), the properties of the nonreinforced trials during training (5, 6), and the role of emotional behavior generated by the nonreinforced trials (2, 18). There is a great deal of potential material here for an experimental analysis of child behavior and development.

Even when information on intermittent reinforcement was based primarily on infrahuman subjects, writers could see possible applications to child growth and behavior. Thus Keller and Schoenfeld say:

With the facts of P-R [periodic reconditioning] in hand, you should be able to make some critical deductions about educational procedure which strive to control behavior. You should, for example, see how one would go about teaching a child to be persistent in the face of failure. One would make sure, in training for skill, for confidence at work, or for willingness to persist in social activities, that the child is guaranteed some measure of success and approval regularly at first, but later only occasionally, so that he will not give up in the face of setbacks (11, p. 101).

Perhaps the time is not too long before generalizations about the effects of adult-child interactions may be derived from laboratory studies with children.

#### SUMMARY

The problem for investigation is whether variable ratio intermittent reinforcement training results in more resistance to extinction than continuous reinforcement training when the number of reinforcements is held constant. Two experiments involving operant or instrumental conditioning techniques were performed with 39 preschool children. Six reinforcements (plastic trinkets) were used in the first experiment, five in the second. Intermittent training patterns consisting of reinforcements on 20 per cent of the responses were employed in both investigations. Results are in agreement with those from studies using subhuman subjects in that the intermittent reinforcement showed more resistance to extinction than the continuous reinforcement. The findings are discussed in relation to other investigations with children.

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## ORGANISMIC GROWTH: SOME RELATIONSHIPS WITHIN THE INDIVIDUAL AMONG CYCLES OF GROWTH IN PHYSICAL CHARACTERISTICS

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Interrelatedness among growth processes is considered by many psychologists and educators to be characteristic of intra-individual human growth. As yet, however, few studies of intra-individual interrelationships have been reported, and these have usually been based upon graphical analyses. Honzik and Jones (4) employed this procedure in their study of physical and mental growth during the preschool years. Again, Stolz and Stolz (8) used primarily graphical methods in presenting the results of their investigations on the synchronous nature of growth in physical characteristics.

The possibility of using other procedures for the study of longitudinal growth data was discussed by Jones (2, p. 660), who pointed out that data from time series "have not yet been employed in a systematic analysis of the concept of organismic unity." Correlations have been used rather infrequently in studies of intra-individual growth, although we believe that suitable techniques are available. In the P-technique (3), for example, paired scores for intra-individual coefficients of correlation might be measures of weight<sup>1</sup> and strength of grip of the right hand of an individual at a series of ages during adolescence, as in Table 1. [The data are for Case 50 in the California Adolescent Study (5).] The measures for each characteristic are sampled over a number of ages (column 1) for an individual.

There is, however, a major difficulty connected with using measures of status, as in Table 1, for intra-individual correlational analysis.

Each series of measures will have a high rank-order correlation with the chronological ages at which the measures were determined, so that the intercorrelations for the measures themselves must necessarily be large. (For Table 1, the correlations ( $\rho$ ) between CA and weight, and CA and strength, are about .98.) Correlational analysis is clearly not appropriate for studying this type of longitudinal data.

A more promising line of inquiry might be with reference to the relationship among the *rates of change* of measures of physical characteristics. The annual rates of change in metric units for two physical characteristics,

<sup>1</sup> The techniques of measurement for the subjects of this report are described by Stolz and Stolz (8), who also report on the reliabilities of the measures.

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TABLE I

STATUS MEASURES OF WEIGHT AND STRENGTH OF RIGHT  
GRIP PAIRED BY CHRONOLOGICAL AGE

(Case 50)

<i>CA</i>	<i>WT (gm.)</i>	<i>RG (kg.)</i>
11.0 .....	359	23
11.6 .....	361	26
12.0 .....	370	27
12.6 .....	386	28
13.1 .....	415	27
13.6 .....	422	31
14.1 .....	470	31
14.6 .....	462	35
15.1 .....	487	35
15.6 .....	548	42
16.1 .....	596	51
16.6 .....	620	52
17.1 .....	638	53
17.6 .....	633	59
18.1 .....	677	61

weight and right grip, are listed on the left side of Table 2 (Case 50). These are computed by dividing the difference between successive measures by the interval of time in which the change occurred (9). Spearman's rank-order correlation between the two series of measures is  $-.15$ . In this instance, the obvious conclusion would seem to be that there is no significant relationship between the rates of change in weight and right grip during the adolescent years. There may, however, be a relation of a sequential nature, or related cycles of growth.

*Time Series Involving Cycles*

Economists have long recognized that cycles in one phenomenon may accompany cycles in some other. Thus, increases, or decreases, in the Index of Industrial Stocks may precede, coincide with, or follow similar changes in the Index of General Business Activity. In one example, presented by Mills (7, p. 390), the coefficient of correlation between the values of these two indexes at concurrent times was found to be  $.55$ ; however, the value of the coefficient of correlation was increased to  $.76$  when the Index of Industrial Stocks at a given time was paired with the Index of General Business Activity that prevailed four months later.

Cattell (3, p. 363) has used the phrase "time analyzed P-technique" to refer to the use of P-technique correlational and factorial analysis involv-

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TABLE 2

MEASURES OF RATE PAIRED BY CA AT WHICH STATUS MEASURES WERE  
OBTAINED AND BY STAGGERING SO AS TO PAIR THE  
MAXIMUM RATES OF CHANGE\*

(Case 50)

PAIRED BY CA			PAIRED AT PEAK RATE OF CHANGE				
CA	WT	RG	CA	WT	CA	RG	
	Rate of Change			Rate of Change		Rate of Change	
11.6 . . . .	3	5	11.6 . . . .	3	12.0 . . . .	3	
12.0 . . . .	23	3	12.0 . . . .	23	12.6 . . . .	2	
12.6 . . . .	27	2	12.6 . . . .	27	13.1 . . . .	—2	
13.1 . . . .	58	—2	13.1 . . . .	58	13.6 . . . .	8	
13.6 . . . .	14	8	13.6 . . . .	14	14.1 . . . .	0	
14.1 . . . .	96	0	14.1 . . . .	96	14.6 . . . .	8	
14.6 . . . .	—16	8	14.6 . . . .	—16	15.1 . . . .	0	
15.1 . . . .	50	0	15.1 . . . .	50	15.6 . . . .	14	
15.6 . . . .	122*	14	15.6 . . . .	122	16.1 . . . .	18	
16.1 . . . .	96	18	16.1 . . . .	96	16.6 . . . .	2	
16.6 . . . .	48	2	16.6 . . . .	48	17.1 . . . .	2	
17.1 . . . .	36	2	17.1 . . . .	36	17.6 . . . .	12	
17.6 . . . .	—10	12	17.6 . . . .	—10	18.1 . . . .	4	
18.1 . . . .	88	4					

\* In the growth cycles, the age of maximum rate of change in weight is 15.6 years, and in strength of grip it is 16.1 years. The former characteristic is said to "lead" the latter by 16.1 - 15.6, or .5 years. It might also be said that the latter lags behind the former by .5 years.

ing "staggered or lead and lag correlations." He suggested that "Factorizations could thus be carried out with correlations based on different amounts of lead and lag to see which give the clearest factor structure and the highest loadings. . . . This will probably prove to be one of the most powerful means of exploring causal relations when using factor analysis aided by data employing a time signature" (3, pp. 363-364).

Physical growth is known to occur in cycles. It is also known that the peak rates of growth in various physical characteristics do not necessarily occur at the same point in time (8). Jones (6) has shown that the puberal spurt in strength tends to occur later than in weight. This is illustrated by Case 50 in Table 2, and the peak rate of growth is also later in strength.<sup>2</sup>

If we plot these increments on a base line which adjusts for maximum growth age, the result is shown in Figure 1. Here we note an apparent

<sup>2</sup> The semi-annual fluctuations within a cycle in the early part of the data, shown in Figure 1, illustrate the condition reported by Jones (6) that rates of growth in different characteristics vary with the season. Growth in strength is generally greater in the spring, but in weight it is generally greater in the fall months.

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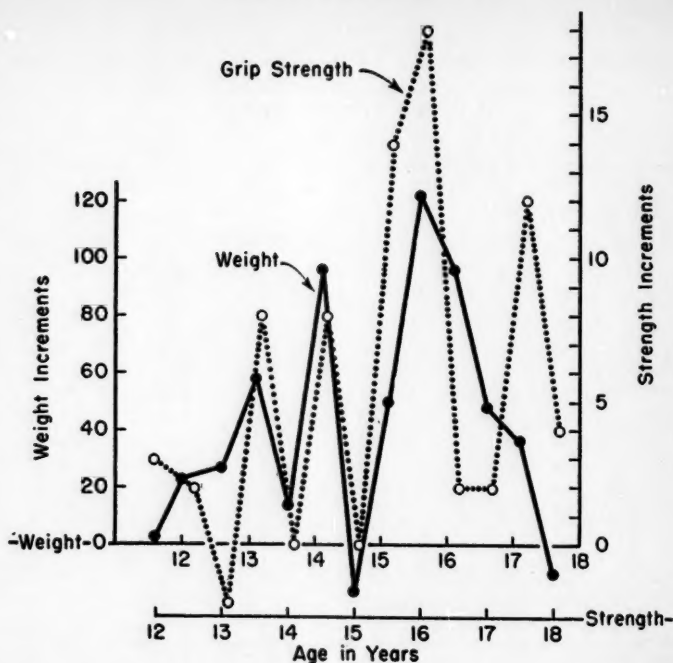


FIGURE 1—Growth increments in weight and strength for Case 50 plotted on a base line which adjusts for maximum growth age.

relation between the weight and strength increments. The effect of the six-months adjustment (shifting back the strength increments to allow for the six-months difference in peak rates of growth) is to change correlation of rates from  $-.15$  to  $.55$  (significant at the  $.05$  level).

From this one case, and from only two variables, it appears that the numerical value of a coefficient of correlation may be changed by staggering one series of measures so as to consider the time-lag in cyclical growth. In the illustration, the pairing of scores was altered by placing the measures of maximum rates of change in juxtaposition. There may be other ways of matching scores, for instance, by pairing measures at the onset or at the end of the adolescent spurt in growth in various characteristics.

#### *Correlational Matrices from Original and Staggered Series*

Since it has been shown that a coefficient of correlation between measures of rate of change in physical characteristics can be modified by a

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TABLE 3

THE NUMBER OF VARIABLES CORRELATED AFTER STAGGERING THE MEASURES OF RATE OF GROWTH, AND SOME EFFECTS OF THE STAGGERING

Case	1	2	3	4	5	6	7	8	9
50 .....	8	2	10	17	9	3	1	.28	.36
52 .....	7	4	11	34	12	11	3	.31	.28
190 .....	7	3	10	24	12	4	0	.29	.39
234 .....	7	4	11	34	10	7	3	.18	.26
244 .....	7	4	11	34	1	18	2	.46	.29

maturity adjustment in the pairing of the scores, it may be of interest to determine how often and how extensively such changes occur, and to compare factorial patterns obtained from matrices based upon different pairings of measures, such as pairing by chronological age and by peak rate of growth.

Some answers to such questions were sought from correlational and factorial analyses of the measures for each of five cases in the California Adolescent Study.<sup>3</sup> Information about each of these subjects is summarized in Table 3, the columns (1 to 9) containing the following data:

- Column 1. The number of characteristics<sup>4</sup> for which the peak rates of growth occurred at the same chronological age.
- Column 2. The number of characteristics for which the maximum growth rates were placed in juxtaposition without the loss of too many measures.
- Column 3. The number of characteristics available for correlation and factorial analysis.
- Column 4. The number of coefficients of correlation involving adjusted variables.
- Column 5. The number of coefficients of correlation involving the adjusted variables that were increased by at least .20 as a result of the adjustment.
- Column 6. The number of coefficients of correlation involving adjusted variables that were decreased by at least .20 as a result of the adjustment.
- Column 7. The number of coefficients of correlation among nonadjusted variables that were changed by at least .20 as a result of the adjustment.
- Column 8. The median value of the *rhos* prior to adjusting the measures.
- Column 9. The median value of the *rhos* after the adjustment.

<sup>3</sup> Several conditions, not all of which were met for a large number of subjects in the Adolescent Growth Study, would be desirable for a more complete analysis of this problem: (1) more frequent measurement, possibly every three months; (2) equal intervals between measurements—our intervals varied by up to .1 year from a half-year interval in 15 per cent of the measures; inequality of intervals may affect the data when rates of change are adjusted to take into account lead and lag in maximum rates of growth; (3) comparisons of the results of these analyses with other measures of development, such as rates of maturing.

<sup>4</sup> The characteristics studied are listed at the bottom of Table 5.

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From a consideration of the contents of Table 3 it is seen that:

1. For each subject the number of characteristics with maximum growth rates at the same chronological age is either seven or eight.
2. It was possible to adjust the measures for two, or three, or four of the other variables so that for each case a matrix of either 10 or 11 variables could be obtained for which the measures were paired for the rates of maximum growth (column 3).
3. From one-half to two-thirds of the coefficients involving the adjusted variables were modified by at least .20 as a result of the adjustment (columns 4, 5, and 6).
4. In some subjects, the adjustment resulted in more increases than decreases in the values of *rho* (Case 190); in other subjects the reverse was found (Case 244) (columns 5 and 6).
5. Few of the correlations involving the unadjusted variables were changed by as much as .20 points as a result of the adjustment (column 7).
6. The median value of all coefficients in each matrix increased in some cases and decreased in others by amounts varying from .03 to .17 (columns 8 and 9).
7. It appears that staggering rates of growth for physical characteristics so as to pair measures for maximum rates of growth does produce some changes in the values of the coefficients of correlation, and that the frequency and extent of the changes vary from one individual to another.

### *Significant Rhos*

It has been shown that varying numbers of *rhos* were changed by at least .20. The numbers and percentages of *rhos* significant at the .05 level in each type of matrix are shown in Table 4.

The percentages of the *rhos* that were significant at the .05 level vary somewhat from one type of matrix to the other within a given subject. If

TABLE 4  
NUMBER OF RHOS SIGNIFICANT AT THE .05 LEVEL

Case	Total Number of Rhos	Number and Percentage of Rhos Significant at the .05 level			
		Paired by CA		Staggered Measures	
		Number	%	Number	%
50 .....	45	6	13	8	18
52 .....	55	10	18	12	22
190 .....	45	7	16	6	13
234 .....	55	11	20	8	14
244 .....	55	19	34	11	20

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we are willing to assume independence in our tests of significance for each individual, we may determine whether the number of *rhos* significant at the .05 level is greater than we can expect by chance (1). Eight of the critical ratios were in excess of 1.96, and the other two were each 1.75. We may conclude that the number of significant *rhos* is in excess of what might be expected by chance. Nevertheless, a large percentage of the *rhos* are not significant even at this level.

## Factor Loadings

Evidence concerning the principle of unity of growth may be found from the values of the first common-factor loadings computed from the correlational matrix for each individual. Large values would imply a high degree of unity of growth in the physical characteristics studied.

The first-factor loadings from each matrix for each subject were obtained, first from the original and then from the staggered data. Unity was entered in the diagonal cells in order to maximize the values of the loadings. The results are shown in Table 5.

Factor loadings from original and staggered data showed similarity in some cases and dissimilarity in others. For instance, for one variable (in Case 190), the loadings were .77 in both matrices; in Case 52, the

TABLE 5  
FACTOR LOADINGS FOR ORIGINAL AND FOR STAGGERED DATA

Variable†	Case 50		Case 52		Case 190		Case 234		Case 244	
	O*	S*	O	S	O	S	O	S	O	S
WT .....	.76	.90	.93	.83	..	..	.83	.63	.85	.49
HT .....	..	..	.67	.57	.77	.77	.66	.77	.68	.75
SL .....	.46	.55	.65	.66	.57	.69	.71	.74	.55	.68
BA .....	.79	.78	.64	.38	.63	.83	.50	.64	.61	.46
BI .....	.64	.69	.52	.56	.75	.77	..	..	..	..
CD .....	.33	.35	.30	.59	.66	.61	.39	.30	.75	.84
CC .....	.62	.54	.22	.73	.34	.51	.01	.40	.68	.26
AC .....	.44	.56	.80	.69	.63	.77	.56	.44	.80	.69
TC .....	..	..	.76	.64	.78	.47	.80	.59	.73	.59
LC .....	.69	.81	.77	.57	..	..	.62	.50	.75	.61
RG .....	.31	.64	-.02	.21	.27	.57	.47	.52	.79	.75
LG .....	.64	.53	..	..	.65	.70	.51	.73	.62	.59
Percentage Variance ...	35	43	40	37	39	46	35	34	51	40

\* O—original series; S—staggered series.

† The abbreviations are: WT—weight; HT—height; SL—stem length; BA—bi-acromial width; BI—bi-iliac width; CD—chest depth; CC—chest circumference; AC—arm circumference; TC—thigh circumference; LC—leg circumference; RG—right grip; LG—left grip.

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loadings for one characteristic changed from .22 to .73. The percentage of the variance accounted for by the factors increased in some cases and decreased in others as a result of staggering the measures. The percentages for original and for staggered data, respectively, are for Case 50: 35 and 43; Case 52: 40 and 37; Case 190: 39 and 46; Case 234: 35 and 34; and Case 244: 51 and 40. There are, then, individual differences in the effects of staggering the data upon the resulting factor loadings, unless these differences can be shown to be due to chance. The *rhos* between the two sets of first-factor loadings were .60, .48, .14, .56, and .28 for Cases 50, 52, 190, 234, and 244, respectively. The similarity between first-factor patterns from original and staggered data varies from one individual to another, and, generally, there is considerable modification in the patterns.

### SUMMARY

It has been shown by Stolz and Stolz (8) that for any individual the peak rates of growth in different physical characteristics may or may not occur at the same chronological age during adolescence. They employed the term "asynchronous" to describe the situations in which the maximum rates of growth do not occur at the same chronological age.

It occurred to the writer that the presence of cyclical asynchronous growth in physical characteristics might obscure the presence of similarities in the patterns of growth within the individual when the measure of similarity is a coefficient of correlation of the P-type. If the fact of asynchronous growth were controlled by using "staggered or lead and lag correlations" (3) it might be that the index of the relationship among measures of rates of change would be increased, and that the existence of unity in the growth patterns would be more apparent than if the correlations (P-technique) were computed by pairing measures by chronological age.

Rates of change in physical measures at a series of chronological ages were obtained for each of five boys in the California Adolescent Study. Spearman's *rhos* were computed between the rates matched for the age at which the measures were obtained. The first-factor loadings for each of the resulting matrices (one for each boy) were computed, with unity as the diagonal entry. Then the pairing of the rates was adjusted by placing in juxtaposition the maximum rates of growth in each characteristic, leaving the serial order of the measures unchanged. Again, the first-factor loadings were determined.

The effects of using staggered or lead-and-lag correlations were investigated by comparing the values of the two sets of *rhos* and of first-factor loadings. From 50 to 70 per cent of the *rhos* involving the staggered measures were either increased or decreased by as much as .20. The nature and the extent of the change varied from one boy to another. In one case, the *rhos* involving the adjusted or staggered measures tended to decrease, in another, they increased, and in another there were about equal numbers

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of increases and decreases. The percentages of the *rhos* for each boy that were significant among the original coefficients and in the lead-and-lag correlations varied from 13 to 34, with the majority being less than 20 per cent. Such evidence does not favor a hypothesis of unity of intra-individual growth when unity is defined by coefficients of correlation between rates of physical growth during adolescence.

The values of the first-factor loadings from the two sets of matrices were markedly similar in some instances, and quite different in others. The rank-order coefficients of correlation between the patterns varied from .14 for one boy to .60 for another.

The percentages of the variances accounted for by the first factor were 35, 40, 39, 35 and 51 for the original matrices and 43, 37, 46, 34, and 40 from the matrices involving the staggered correlations. In neither procedure does the first factor appear to imply a high degree of unity of growth within the individual.

It may be concluded that in addition to individual differences in physical growth, marked intra-individual differences occur. These latter cannot be attributed solely to the effects of differences in the timing of cyclical growth in physical characteristics.

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# THE RELATIONSHIP BETWEEN PARENTAL ACCEPTANCE AND ADJUSTMENT OF CHILDREN<sup>1</sup>

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The importance of parental attitudes in the development of personal and social behavior is one of the basic tenets in the fields of child development and parent education. In the clinician's therapy room this relationship seems obvious. In the classroom a teacher may often be sure the reason "Johnny can't—" is because of parental attitudes. But can the generalizations from the clinician or from the teacher or, for that matter, from studies of atypical samples of families and children in general be valid guides for assessing the behavior of children?

## THE PROBLEM

In this study an attempt was made to measure the relationship between parental acceptance and personal and social adjustment characteristics of children for a carefully-controlled sample of 256 parents and their children. This problem is suggested by several considerations. Present research findings indicate certain home and family influences are related to various attitudinal and behavioral characteristics of children, but few of the studies have been concerned with parental acceptance per se (24, 25). Most of the studies have been concerned with various categories of "problem children," or preschool children; few studies have been based on any controlled samples of children in families (1, 2, 4, 5, 13, 14, 15, 16, 18, 22, 23). In addition, some writers have implied that there is a relationship between the degree to which a child is accepted by his parents or other "significant" persons and his personal and social characteristics although empirical evidence has not been cited (20). Therefore, a statistical investigation of the

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relationship between parental acceptance of children and the personal and social adjustment characteristics of the children for a fairly large sample of "typical" families seemed timely.

### MEASURING INSTRUMENTS

The Porter Parental Acceptance Scale, apparently unique and the first of its kind, was used to measure the degree to which parents may be said to accept their children. An operational definition of parental acceptance of children and the development of a scale to measure this variable have been reported by Porter (17), together with data on its reliability and validity. Reliability coefficients for the samples used in the present study have been reported (12) and it is possible to offer further indirect evidence for the validity of the items comprising the acceptance scale.

Porter reports that the items of the scale were derived from an operational definition of parental acceptance, and a conceptual scheme was used to guide the construction of the responses. High agreement was found among the judges' rankings of responses (17).

In this study, an item analysis was made in an effort to estimate the degree of internal consistency of the Porter scale. The group comprising the highest quartile in total test scores was compared with the group comprising the lowest quartile, with respect to their mean scores on each item. The difference between means was tested for significance to determine whether the item had discriminated effectively between high and low scoring groups. Only one item failed to show a significant  $t$  value for the item analysis of fathers' responses. For the other 39 items,  $t$  values ranged from 2.26 to 8.00; for 33 of the items the  $t$  values were greater than 3.46, the value needed for a probability level of .001 ( $N = 64$  in each quartile). Only one of the items failed to discriminate between high and low scoring mothers. The  $t$  values of the remaining items varied between 2.61 and 9.30 for the mothers. Thirty-five of the items had  $t$  values in excess of 3.46. It is quite clear that the items discriminated consistently between high and low scorers, justifying the assumption of a high degree of item validity when the total test score is the criterion.

Several methodological and theoretical considerations limited the selection of personality tests which might have been used to measure personal and social adjustment characteristics of the children. The sample design and contemplated field procedures for the study made it impossible to consider using any of the projective devices such as the CAT, TAT or Rosenzweig Picture-Frustration Test. Since only fifth grade children were going to be used as subjects, many of the personality tests including the Bernreuter Personality Inventory, the Bell Adjustment Inventory, the Personal Audit, the Mooney Problem Check List or the Thurstone Temperament Schedule could not be used, since all of these inventories begin with the seventh or ninth grade level.

A review of several test bibliographies showed that two instruments could be considered adequate for measuring personal and social adjustment characteristics of fifth grade children. These were the California Test of Personality (26) and the Rogers Test of Personality Adjustment (19). The California test has been widely used. There is considerable reliability and validity data available for it; yet there are some important criticisms of this test (7, pp. 60-62; 8, pp. 55-59). Although the Rogers test is older than the California, it was examined for possible use. Adequate reliability and validity data were available. It also appeared to possess several advantages over the California test for the purposes of this study. Children's responses to the California test are limited to a "Yes" or "No" choice. The indirect testing techniques used in the Rogers test permit the child to express a wide range of responses: The child can compare his present self with his ideal self and among other things, compare himself with his peer group. Even though the Rogers test was developed several decades ago, the nature of the responses obtained from it fit very well with current phenomenological personality theory. Since the theoretical basis of this study, as described by Hawkes (11), rests upon a phenomenological basis, the Rogers test seemed to be the more appropriate test for the purposes of this investigation. In addition to the statistical support which might be cited for support of the use of the Rogers test, it should be pointed out that the test is very well disguised and has received favorable comment from clinicians who have used it [see Louttit, in Buros (7, p. 41)]. With these considerations in mind, the Rogers test was adopted for use in this study.

The decision to adopt the Rogers test also led to the definition of the types of children's adjustment characteristics that were studied. Since the Rogers test is an older test, a brief description of the test and its reliability and validity characteristics is given. Four scores and a total score can be derived (19): The first of the diagnostic scores Rogers called the personal inferiority score which indicated roughly the extent to which a child thinks himself to be physically or mentally inadequate—duller, weaker, less good-looking, less capable than his peers. The second score is social maladjustment, the extent to which he is unhappy in his group contacts, poor at making friends, poor at social skills. The family relations score indicates the degree of his conflict and maladjustment in his relations with his parents and siblings, such as jealousies, antagonisms, feelings of being rejected, and overdependence. The fourth score, the daydreaming score, is designed to indicate the extent to which the child indulges in fantasies and unrealistic thinking. Rogers considered the total score as an indication of the seriousness of the child's maladjustment.

Reliabilities of the test scores, determined for a sample of 43 children by a retest given after an interval of one month, ranged from .65 to .70. The reliability coefficient for the total score was .72. In the present study, 51 children were retested after a one-week interval. Reliability coefficients

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for the four scores varied from .67 to .77 and the reliability of the total score was .71.

Rogers used three methods to estimate the validity of the test scores. Comparisons were made between the personality ratings given the children by clinicians who knew them well and the children's test scores. These correlations ranged from .39 to .48. The extent of the agreement among the clinicians' rating was of similar magnitude. Rogers concluded that the test gave scores which were as valid as ratings made by clinicians who knew the children. An individual study of children making the highest and lowest scores on the test and the agreement between identification of "problem" children selected by means of test scores and by teachers' ratings were other methods used to estimate the validity of the test. In summarizing the results of the validity checks for the adjustment test, Rogers states, "The fact that the results are fairly consistent throughout points to the conclusion that the test does roughly measure children's attitudes. The test scores were found to be a crude but reasonably accurate yardstick for measuring unhappiness and maladjustment in the youngsters studied" (19, p. 80).

### THE SAMPLE

To facilitate sampling procedures and to gain some control over the measurement of the variables, the ages of the children were held constant by using the fifth grade level as the criterion for selecting children. Acceptance measurements of the parents were also controlled to the extent that each parent was asked to respond to the acceptance scale on the basis of his attitudes and behavior toward his fifth grade child. Using children of only one grade level also permitted development of a sample design by which suitable families were selected by means of identifying the children of those families.

It also seemed essential to control several characteristics of the families. Two criteria, that both natural parents of the child must be living together with the child and that the family must consist of at least two children, were established. For methodological reasons, the selection of families was limited to rural areas and small towns (2500 to 10,000 population by the 1950 census). Four states, Iowa, Ohio, Kansas and Wisconsin, were the primary areas of sample selection.

Since the most practical manner of selecting a sample of families from this universe appeared to lie in first selecting the children from fifth grade classes in school, all school districts having fifth grade classes were defined as possible sampling points in each state.<sup>2</sup> Among the several possible sampling plans which might have been used to draw samples of fifth grade classes in each of the four states, a stratified random design seemed most

<sup>2</sup> Schools with less than 20 pupils in the fifth grade were combined into units with at least that number of children. An exception was made for one- or two-room schools which were not considered as possible sampling points because time and cost factors seemed to indicate that any sample containing such small units was impractical.

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appropriate.<sup>3</sup> With such a sample it is always desirable to "scatter" the sample points as much as possible, subject to time and cost limitations, and to keep the number of families at each sample point small. No precise calculations were made on the size of the sample at any point or on the number of sample points per state, but after consideration of time and cost estimates of the field work it was decided to have eight sample points per state with eight families selected at each of the sample points. Thus, the state samples consisted of 64 families and the total sample included 256 families.

The eight sample points for each state sample were chosen from two population strata: (1) towns in the 2500 to 10,000 population range<sup>4</sup> and (2) rural areas. A proportional allocation was made between these two strata for the eight sample points in each state based on the total populations of the strata to the population of the state. For the Iowa sample, for example, two urban and six rural sampling points were required.

The two urban points were selected by a probability method based on the sizes of the populations of all the cities in Iowa in this stratum to the total population of the stratum. Each city within the defined range of population was listed by its 1950 census population. A cumulative population table was constructed based on these populations. Two numbers were then drawn at random (two cities were to be selected) between the lower limit (0000) and the upper limit (312,658) of the cumulative population distribution. If the number chosen was in the range of a given city's contribution to the size of the stratum that city was selected.

In the second stage of sampling for the urban stratum, the class of fifth grade children to be tested was selected within each of the primary sampling points. If there were only one elementary school with only one fifth grade class, the entire section was used. If there were two or more sections of fifth grade children, one section was chosen by the same probability method used in selecting the cities.

Sampling for the fifth grade classes in the rural stratum required the use of several sampling units. Counties were first selected on the basis of their total population by the probability proportional to size method described for the selection of the cities. Within each of the selected counties, a school or combination of schools was chosen by the same method. And finally, in only a few rural sample points it was necessary to select one class of fifth grade children from the several classes in the school.

All the children in the selected classes completed the Rogers test under the direction of the interviewer. They also filled out a short information blank which was used to determine if their family met the criteria for inclusion in the universe of families defined for this study. A random

<sup>3</sup> Appropriate general references for the procedures used and for estimation from this type of sample are Cochran (9) and Hansen, *et al.* (10).

<sup>4</sup> Cities in this range which were parts of metropolitan areas were excluded from the urban strata.

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selection of eight children and hence, families, was drawn from the list of children whose families met the criteria. Four alternate families were also drawn and were used when necessary in the exact order of their selection.

Home interviews were used to obtain the parents' responses to the acceptance scale and several other scales not reported in this study. The fathers and mothers completed the Porter scale independently in the presence of the interviewer. Field work was begun in Iowa in October, 1954, and completed in Ohio in May, 1955. One researcher did all the testing and interviewing in all four states.

Not all of the originally selected families at many of the points were able or wished to cooperate in the study. Approximately 11 per cent of the Iowa sample, 30 per cent of the Ohio sample, 19 per cent of the Kansas sample and 22 per cent of the Wisconsin sample consisted of alternate families. Fifty-two families, approximately 20 per cent of the total sample, were alternate families.

A detailed description of the sample characteristics has been reported (12). In general, the sample was composed of a middle and lower socioeconomic class of rural and small town families. Representation in all occupational levels was achieved without any apparent bias in the direction of higher income or prestige occupations. Most of the parents had an educational attainment of high school or less. The majority of the parents were in their late thirties or early forties. Children in the sample were about evenly divided between boys and girls, 129 boys and 127 girls.

## FINDINGS

Correlation analysis was used to test the hypothesis that there is a positive relationship between the acceptance scores of each of the parents and the five adjustment scores of the children.

The acceptance scale is weighted in such a manner that high score indicates greater acceptance of children while high scores on the several dimensions of the Rogers test indicate maladjustment. Therefore, if parental acceptance is related positively to the adjustment of the children, statistically moderate (or higher) *negative* correlations should be found.

The hypothesis was tested for the five father-child and the five mother-child relationships for each of the four state samples. Uncorrected data for each state sample were summated for the association of the variables for the total sample.<sup>5</sup> It appeared that the most meaningful coefficients to

<sup>5</sup> The data from the four samples were combined into a total sample for an over-all estimate of association among the variables after it was determined that state sample differences for parents' and children's mean scores were nonsignificant. Analysis of variance was used to test for the significance of the differences of the mean parental acceptance scores for the fathers and mothers and for the children's five mean adjustment scores for the four state samples. None of the *F* values was significant.

The analysis of variance was calculated on the assumption that each state sample was a simple random sample. While no direct test could be easily made to support this assumption because in this study a stratified probability sample with random selection of

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report were the average within-state correlations since these were based on a larger number of cases. Furthermore, minor interstate sample variations would be eliminated.

Before examining the total sample (average within state) correlation coefficients presented in Table 1, a brief summary of the relationships for the state samples might be given. Forty correlation coefficients were calculated for the relationships between the parental acceptance scores and the children's adjustment scores. Three of the values were significant at the 5 per cent level, but one of the coefficients was positive or opposite in direction from what had been expected. The largest correlation ( $r = .27$ ,  $N = 256$ ,  $p < .05$ ) indicated only a slight relationship between parental acceptance and one of the adjustment variables. At the state sample level, there appeared to be virtually no relationship between the variables measured in this study. Table 1 indicates that essentially the same results were found for the total sample analyses.

Only two of the 10 total sample correlations reached the 5 per cent level of significance. The relationship between the fathers' acceptance scores and children's social maladjustment scores and the relationship between the mothers' acceptance scores and the children's personal inferiority scores may be taken as significant. Both of the coefficients were negative

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families only in the last stage was used, it was possible to compare unweighted sample point data with unbiased estimates and to determine if there was any significant variation among the sample point statistics for each of the state samples.

Because the several intermediate sampling units used for each stratum varied in size, the classes and the children within the classes were selected with unequal probabilities. Consequently, unbiased statistics for the samples should have been calculated by using properly weighted sample point data. But if it could be shown that unweighted data agreed reasonably well with properly weighted data, then calculations might be considerably simplified. Comparisons of weighted mean Porter parental acceptance scores for the fathers and the children's mean Rogers social maladjustment scores, the proportion of fathers who were farmers, and the proportion of wives who graduated from high school, for each state sample and for the total sample with similar unweighted statistics demonstrated that for the purposes of this investigation unweighted statistics would provide adequate estimates. The acceptance means for the total sample by each method of calculation were 132.83 and 132.82 for the acceptance scores and 14.94 and 14.80 for the social maladjustment scores. The proportion of farmers and proportion of wives who were high school graduates found by each method of calculation for total sample data were .27 and .30 and .55 and .55, respectively. Comparisons of results for each state sample showed slightly larger differences, but still very similar results. Cochran (9, Chaps. 10 and 11) and Hansen, Hurwitz, and Madow (10, Vol. I, Chap. 6, and Vol. II, Chap. 7) describe the rationale for calculating the weighted statistics. Details of the procedure used and the results obtained for this investigation, may be found in Burchinal (6, Appendix A, Calculation of Weighted Statistics).

These comparisons seemed to indicate that unweighted sample point data might be safely used, but there was still the question whether or not any significant variation existed among the eight sample point means for each state sample. To answer this question, the eight parental acceptance mean scores for each set of parents and the Rogers total mean scores for each state sample were tested by analysis of variance. None of the resulting  $F$  values was significant. Details of the calculations and results are presented by Burchinal (6, Appendix B, The Significance of the Differences Among the Parents' and Children's Mean Scores). On the basis of the results obtained by means of these studies of the data, the unweighted sample point data were combined into state samples as if the families comprising the sample were selected by a simple random method.

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TABLE I

AVERAGE WITHIN-STATE CORRELATION COEFFICIENTS BETWEEN PARENTS' ACCEPTANCE AND CHILDREN'S ADJUSTMENT SCORES

<i>Parents</i>	<i>Personal Inferiority</i>	<i>Social Maladjustment</i>	<i>Family Relations</i>	<i>Day Dreaming</i>	<i>Total Score</i>
Fathers .....	— .011	— .132	.046	.071	— .034
Mothers .....	— .120	.047	.029	.004	— .043

NOTE.—Each correlation coefficient is based on 256 pairs of cases.

or in the expected direction. The values, however, were very low and hardly warrant interpretation.

In general, the hypothesis for the relationship between parents' acceptance of children and the adjustment characteristics of the children was found to be untenable. Fifty correlation coefficients were calculated and only five were significant at the 5 per cent level. Moreover, the correlations which were significant were quite low. As measured in this study, there was virtually no relationship between parental acceptance of children and the adjustment characteristics of the children.

In view of the nonsignificant nature of the findings, the question might be asked: What relationship exists between the children's adjustment scores and values representing the combined parents' acceptance scores. It could be reasoned that children whose parents display marked differences in acceptance toward them would show greater indications of maladjustment as measured by the Rogers scores. This problem was investigated by correlating the differences between the parents' acceptance scores with the adjustment scores of the children. In line with the hypothesis stated earlier, it was assumed that there was an inverse relationship between the differences between the parents' acceptance scores and five adjustment scores of the children. In this case, the correlation values should be positive in order to support the hypothesis.

The differences between the parents' scores ranged from zero to 69. Approximately 62 per cent of the differences between the parents' acceptance scores were greater than 10 points, 34 per cent of the differences were greater than 20 points and 15 per cent of the differences were greater than 30 points.<sup>6</sup>

Since the results of the analyses for the relationships between the differences in parental acceptance and the children's adjustment scores were similar to correlation coefficients found earlier, the table of coefficients has been omitted.

<sup>6</sup> The means, standard deviations, and a frequency distribution of the parents' acceptance scores have been reported elsewhere (12).

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Only one of the 20 coefficients for the state correlations was significant ( $r = .32, p < .01$ ). One total sample coefficient was also significant ( $r = .14, p < .05$ ). None of the other correlation values, for either the state or total samples, was significant. The results of this analysis overwhelmingly demonstrated that the hypothesis for the relationship of the differences between the parents' acceptance scores and the children's adjustment scores was also untenable.

Since no relationship was found between the children's adjustment scores and the differences between their parents' acceptance scores, a further question, whether or not there was any relationship between the children's scores and the sum of the parental acceptance scores, might be asked. It was assumed that children whose parents are both highly accepting would show fewer indications of difficulty in the various areas measured by the Rogers test than children whose parents show little acceptance of them. Because the analysis of the association of the differences between the parents' acceptance scores and the children's adjustment scores showed virtually no relationship, there appeared to be no reason why the scores of the fathers and mothers could not simply be summed in order to test for this relationship. For this analysis, negative correlation coefficients were expected.

Only two of the values reached the level of significance. Both of these correlations were positive or opposite from the direction expected and both were higher than previous values ( $r = .35, p = .01$ ;  $r = .28, p < .05$ ). However, the other state and total sample values for these variables were all nonsignificant. Therefore, these two values were regarded as spurious results.

There was little evidence to support the assumption that the summed acceptance scores of the parents were related to the adjustment scores of the children.

In view of the fact that many of our insights into the psychology of parent-child relationships have come from clinical studies, many of which have been based on atypical groups of children and their parents, one might expect to find a greater degree of relationship between parental acceptance and adjustment of children for those cases representing extreme ends of each of the continua.

TABLE 2

CORRELATIONS BETWEEN LOW SCORING FATHERS' AND MOTHERS' ACCEPTANCE AND CHILDREN'S ADJUSTMENT SCORES

Parents	N	Personal Inferiority	Social Maladjustment	Family Relations	Day Dreaming	Total Score
Fathers ..	65	.040	-.218	.027	-.129	-.143
Mothers ..	62	.028	-.028	-.150	-.051	-.071

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To test for the association between the parents' and the children's scores which were in the extreme ranges of their respective continua, cases representing approximations of the low acceptance quartiles for fathers and mothers and the high adjustment quartiles for each of the five children's scores were selected. For reasons cited earlier, *negative* correlation coefficients were expected.

Table 2 reports the correlation coefficients for the relationships between the acceptance scores of the low scoring groups of fathers and mothers and their children's adjustment scores.

Not only were the correlation values nonsignificant, but they showed no significant increase in magnitude over the correlations found by using the total samples of parents and children. Essentially similar results were found for the association between the scores for the high scoring groups of children on each of the five adjustment dimensions and their parents' acceptance scores. Once again, all the correlation coefficients shown in Table 3 were nonsignificant.

TABLE 3

CORRELATIONS BETWEEN HIGH SCORING CHILDREN ON THE ADJUSTMENT TESTS AND THE FATHERS' AND MOTHERS' ACCEPTANCE SCORES

Parents	Personal Inferiority	Social Maladjustment	Family Relations	Day Dreaming	Total Score
Fathers .....	— .116	— .094	.207	.158	.081
Mothers .....	— .095	.099	.206	.025	.012

NOTE.—The number of pairs for the correlations varied from 65 to 69.

## DISCUSSION

Significant and conclusive findings are easier and perhaps more exciting to report than nonsignificant and inconclusive findings. The findings of this study are, with only a few exceptions, nonsignificant and in terms of the hypotheses which were tested, also inconclusive. Yet nonsignificant findings are in many cases just as important to the understanding of a problem as conclusive results.

Several alternative conclusions might be drawn from the results of the analysis of the data: (1) no relationship exists between the degree to which parents accept their children and the personality adjustment of the children, or (2) the lack of association between the variables stems from inadequate measurement.

It seemed that the first conclusion could not be accepted. Certainly no significant relationship existed between the variables as defined and measured in this study, but there are fairly strong grounds for rejecting

the conclusion that no relationship existed between the variables for the families in the sample. The accumulated findings of other studies are too great to be rejected on the basis of the findings of this study. Furthermore, the conclusion that no significant parent-child relationships existed could be drawn from the analysis of the data only if the tests were demonstrated to be highly reliable and valid and the measuring situation was controlled. But the circumstances under which the measurement occurred were standardized and controlled by the interviewer; hence, it is felt that this latter factor did not affect the measurement of the relationship.

The reliability of the acceptance scale was about .81; the reliabilities of the scores of the Rogers test of personality adjustment, as will be recalled, ranged from .67 to .77. These reliabilities are not high, but they may be taken as reaching at least minimum levels for personality tests. The question of the validity of the tests is more difficult to answer. The validity of the Porter acceptance scale rested entirely on an inferential basis. Rogers made several attempts to establish empirically the validity of his test. On the basis of the reported validity checks performed by these researchers, it was not unreasonable to assume that the tests, at least to some extent, measure the variables they were designed to measure. The almost complete lack of association among the variables, particularly for the analysis utilizing extreme cases, however, does not increase our confidence in the validity of these instruments.

The Rogers test is an old test and questions may be raised concerning its validity for present use. Our concepts of personality have undergone considerable change since the time, about 1930, when Rogers devised his test. There has been considerable social change which may have affected children's responses to the test. Therefore, it could be argued that, given minimal reliability and the lack of well-established validity of the instruments and perhaps at least the partial outmodedness of the personality adjustment test, the two instruments were too gross to permit measurement of the postulated relationship.

This study has demonstrated the need for empirical validation of the Porter scale. It has also shown the great need for the development of a non-projective test or scale to measure specific operationally-defined personality dimensions for children.

#### SUMMARY

In this study an attempt was made to determine what relationship exists between the degree to which parents accept their child and personal and social personality characteristics of the child. The Porter Parental Acceptance Scale and the Rogers Test of Personality Adjustment were used to measure these variables. One score is derived from the acceptance scale while four subscores and a total score are obtained from the Rogers test.

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A stratified probability sample for this study was drawn from a universe defined as including all essentially rural families in the midwest that were "whole" families having two or more children with one of the children in the fifth grade during the 1954-1955 school year. Rural areas and cities not over 10,000 in population were included as possible sample points. The state samples each included 64 families and the total sample included 256 families. Both parents in selected families completed the Parental Acceptance Scale in the presence of the interviewer. The Rogers test was completed by fifth grade children in school under the direction of the interviewer. Approximately 80 per cent of the originally-selected families cooperated in the study. The remaining portion of the sample consisted of alternate families drawn randomly from the various sample points.

One hundred correlations were calculated for three possible relationships between the parents' and children's scores and for the four state samples and the total sample. Whether the scores of each parent were related to the children's scores or whether both of the parents' acceptance scores, (by difference and by sum) were related to the children's scores, the results were essentially similar: there was virtually no statistically significant association between the two series of scores. When correlations among the variables were calculated for extreme scoring groups of parents and children, the coefficients were essentially similar to those found for the total sample.

Two alternate conclusions were considered: (1) that no relationship existed among the variables or (2) the lack of association among the variables was principally due to inadequate measurement. Rejection of the first conclusion was based on the accumulated findings of other studies and commonly held theoretical formulations relative to personality development.

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## THE EFFECTS OF TYPE OF STIMULUS PRETRAINING ON DISCRIMINATION PERFORMANCE IN PRESCHOOL CHILDREN

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Several recent experiments have demonstrated that certain types of stimulus pretraining facilitate subsequent discrimination learning and performance. Using adult human Ss, Dysinger (3) and J. Cantor (2) have demonstrated that Ss taught to respond to a set of stimuli with distinctive verbal responses subsequently perform better in a task requiring the learning of other responses to this same set of stimuli than do Ss who were given the same pretraining with an irrelevant (different) set of stimuli. Gerjuoy (4) and G. Cantor (1) report similar findings with elementary school and preschool Ss. Lawrence (6) found that if rats had first learned a simultaneous discrimination problem involving a given pair of stimulus cues, they subsequently learned a successive problem with the same cues more rapidly than did rats that had been trained on a different pair of cues in the first problem.

One interpretation of these results makes use of the hypothesis of acquired distinctiveness of cues. Briefly, it is assumed that making a distinctive response (e.g., a name) to a stimulus produces a distinctive stimulus which becomes part of the total stimulus complex. If a distinctive response is learned to each member of a set of similar stimuli, the effective similarity of these stimuli is reduced. This decreases the amount of generalization among them, which, in turn, decreases the difficulty involved in associating a new set of distinctive responses to the stimuli.

Another interpretation has been suggested by Kurtz (5) in specific reference to the Rossman and Goss (7) findings but presumably applicable to other similar studies. Briefly, Kurtz suggested that the function of the verbal pretraining is to establish appropriate "observing responses" which transfer into the second task. The name-learning, then, is interpreted as merely a convenient criterion that *E* may use to determine when the appropriate observing responses have been set up. In his own experiment, Kurtz established observing responses with a familiarization procedure

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that required *S* to say "same" when both of two pictures presented were identical and to say "different" when the two pictures were different. He was able to demonstrate that *Ss* subsequently learned verbal responses to pictures that had been presented in pretraining faster than they learned verbal responses to pictures that had not been presented in the pretraining. He also demonstrated that this type of pretraining can be made to interfere with subsequent paired associates learning, presumably because inappropriate observing responses were established in the initial task.

The explanation which Kurtz offers for the Rossman and Goss findings is subject to experimental test. In the conventional relevant-irrelevant stimulus paradigm (1, 2, 3, 4), a group may be included which is given the familiarization procedure that Kurtz demonstrated will produce positive transfer. If the relevant stimulus group performs significantly better on the transfer task than does the Kurtz control, it may be concluded that the learning of names produces a facilitation effect greater than can be accounted for in terms of observing responses. The present experiment tests this hypothesis.

## METHOD

### *Pretraining*

Stimuli used in the pretraining have been previously used and described by G. Cantor (1). The stimuli were pairs of faces; pair A was female faces and pair B was male faces. Both were photographs of pen and ink sketches. A pretraining trial consisted of the simultaneous presentation of two stimulus pictures. Every block of four trials contained four different stimulus settings. One setting consisted of two identical pictures of one member of the pair. Another setting involved the presentation of two identical pictures of the other member of the pair. The two remaining settings were presentations of both members of the pair with the right and left positions of each picture counterbalanced.

Three groups of *Ss* were differentiated with respect to pretraining experience. *Ss* in Group R were given only Pair A and learned to say the name "Jean" each time one member was presented and "Peg" each time the other member was presented. A second group, Group I, was given only Pair B and learned to say "Jack" each time one member was presented and "Pete" each time the other member was presented. *Ss* in Group D were also given Pair A. However, they learned to say "same" when the two pictures presented were identical and to say "different" when both members of Pair A were presented together. Other words or phrases indicating a likeness or non-likeness concept were accepted.

Correction was given for erroneous responses. Subjects used in the transfer task met a criterion of 12 consecutive correct pretraining responses. Those *Ss* not meeting this criterion within 60 trials were not continued in the experiment.

*Transfer Task*

Immediately following pretraining the transfer task was administered. This was identical for all Ss. The stimuli were two wooden boxes,  $3\frac{1}{2}$  inches square, identical except that each box had a different one of the two faces from Pair A (Peg and Jean) mounted on the side presented to the child. The boxes were presented in a "tray" on top of an 18-inch high stand; the entire apparatus was painted flat black. The boxes were such that they could be lifted by the child to obtain a marble located in a groove in the tray. For each S there was one arbitrarily "correct" stimulus. For each trial E put the boxes in prearranged presentation order and placed a marble under the appropriate box behind the stand out of sight of S. A trial consisted of S's selection of one of the stimuli. He was rewarded for the correct response by obtaining a marble; no marble resulted from an incorrect choice and E indicated the box containing the marble. S was instructed to get as many marbles as possible and 30 transfer task trials administered. At the end of Trial 30, S exchanged the accumulated marbles for a toy which he had previously selected. The response measure was the number of correct choices made in the transfer task.

*Subjects*

The subjects were 70 children from the State University of Iowa Preschools and the Iowa City Parents' Preschool. Ages ranged from 3-6 to 5-6. Each treatment group consisted of an equal number of Ss from an upper and lower age level. There were 26 Ss in both Groups R and I; Group D contained 18 Ss. Subjects were randomly assigned to each of the three treatment groups. All Ss were run in the same experimental room.

## RESULTS AND DISCUSSION

The means and standard deviations of pretraining data are given in Table 1. A treatment-by-levels analysis of variance of the mean number of trials to criterion in pretraining was not significant at the 5 per cent level. Correlation of the pretraining scores with scores obtained in the transfer task yielded Pearson coefficients of  $-.13$  for Group R,  $.05$  for Group D, and  $-.35$  for Group I. The Fisher  $z$ -transformation test (8, p. 151) was

TABLE 1  
NUMBER OF TRIALS TO CRITERION IN PRETRAINING

Age	GROUP R		GROUP I		GROUP D	
	Mean	SD	Mean	SD	Mean	SD
Younger .....	19.38	18.17	9.38	8.81	6.44	7.97
Older .....	7.46	6.34	6.15	6.58	4.67	11.46

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TABLE 2  
NUMBER OF CORRECT RESPONSES IN 30 TRANSFER TRIALS

Age	GROUP R		GROUP I		GROUP D	
	Mean	SD	Mean	SD	Mean	SD
Younger .....	19.54	6.02	15.92	3.74	17.11	5.05
Older .....	24.76	6.16	22.38	5.57	19.22	4.30

applied to the correlations. The results indicated that it is tenable to consider them random samples from the same bivariate population. The average correlation of  $-.17$  was not significant, indicating that the differences in number of exposures to the stimuli in pretraining may not be considered responsible for score differences obtained in the transfer task.

The mean number of correct responses for each of the subgroups in thirty trials of the transfer task is given in Table 2. A summary of the treatments-by-levels analysis of variance for these data is given in Table 3. As shown there, the effect of treatments is significant at the .05 level of confidence, while the age factor is significant at the .001 level. The interaction is not significant. The difference between the means of Groups R and I was 3.00, with a  $t$ -ratio of 1.96 ( $p = .05$ ); the Group R — Group D difference was 3.98 with a  $t$  equal to 2.36 ( $p < .02$ ).

These results confirm the findings of G. Cantor (1) and others that the possession of names for the stimuli in a learning task enhances performance on that task. Furthermore, since Group R performed significantly better than Group D, it appears that the facilitation resulting from the stimulus familiarization procedures may not be entirely attributed to the development of appropriate observing responses. On the other hand, the fact that group D was not significantly superior to Group I should not be interpreted as inconsistent with the Kurtz (5) findings. It is not unlikely that the irrelevant stimulus pretraining developed observing responses that were appropriate to the transfer task, since the primary differences between

TABLE 3  
ANALYSIS OF VARIANCE OF CORRECT RESPONSES IN 30 TRANSFER TRIALS

Source	df	M.S.	F	p
Pretraining (P) .....	2	99.86	3.29	.05
Age (A) .....	1	417.74	13.77	.001
P $\times$ A .....	2	25.78	<1.00	
Individuals .....	64	30.34		
Total .....	69			

the members of each pair of stimuli involved the same features (e.g., differences in hair, eyes, and nose.)

On the basis of available evidence, it appears that familiarization procedures designed to produce appropriate observing responses and those designed to produce distinctive verbal responses to the stimuli both contribute to positive transfer. It seems likely that in some experiments using the relevant-irrelevant stimulus paradigm, the observed positive transfer may be due to the combined effects of both factors.

#### SUMMARY

This experiment compared the performance of three groups of preschool children in a simple discrimination learning situation involving a pair of highly similar but discriminable pictures. The groups differed in pretraining experience. Group R had attached discrete names to the pictures used in the transfer discrimination task. Group D had learned to respond verbally with "same" or "different" when presented with these same stimuli. Group I had learned names for different control pictures.

The response measure was the number of correct choices in 30 trials of the transfer task. Analysis of the data showed that Group R performed significantly better than either Group I or Group D. Differences between these latter groups were not significant.

The results were in agreement with previous findings that the possession of verbal labels for the stimuli in a learning task will produce superior performance on that task.

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## THE DEVELOPMENT OF INDEPENDENCE: A COMPARATIVE STUDY

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### THE PROBLEM

The European who comes to the United States is surprised to find a more rapid social development in American children than he has been used to seeing in European children. In thought and action American children become independent of their elders at an earlier age than do European children. Not only do they depend less on adult guidance and judgment, but their consciences seem to mature earlier also.

Stendler (7) has indicated that the American mother unwittingly transfers some of the child's dependency from herself to his peer group at the preschool age, while the Parisian mother still thinks of him as "bébé," constantly needing her to teach him which kind of behavior she approves and which she disapproves. The American child learns to find satisfaction in the approval of his young playmates and strives to avoid their disapproval. Through parent interviews Stendler uncovered certain significant differences in educational goals between Parisian and American middle class mothers. The younger Parisian child is encouraged to be gentle, quiet, self-controlled; in other words, well-mannered and civilized; the older one to be self-sufficient, well-integrated and an individualistic thinker, which prepares him to become a typical Frenchman (7). Middle class American parents attempt to bring up children who will be independent of their parents, who will be accepted, practicing members of their own peer groups. [Note that this is achieved by substituting peer dependency for parent dependency (2).] Riesman (6) explains this difference: In all "inner-directed societies" as in Europe's "old middle class," parents try to bring about, through education, the internalization in their children of the parents' values and goals. The smaller child is pushed until he learns to "push himself to the limits of his talents and beyond," regardless of the possible conflict that his achievements might raise for him in his efforts to relate to his peers. Throughout childhood the parent remains the source of guidance. The child is brought up to believe in and respect the authority of his parents, teachers, and other surrounding adults who, as such, are held to be superior to him. The European parent remains omnipotent and omniscient. Thus Piaget (5) received many answers from Swiss children who believed that it was their father or grandfather who had created the

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world, the rivers, the mountains. European parents think it is wrong to let children realize that they—the parents—do not know everything.

In all "other-directed societies," to which the upper middle class of our large cities belongs according to Riesman, parents are no longer sure of their own values and standards. Due to the rate of change of our society, to social mobility, to immigration, the new generation no longer follows in its parents' footsteps. On the contrary, children are supposed to surpass their parents. As Mead reminds us, many a mother dreams of her son's becoming President of the United States. No longer can the parent feel superior to the child, but suffering from a lack of self-assurance, he does not wish to face the responsibility of directing the child. He believes that the child's contemporaries can advise better than his parents, that they know better what standards are important, what ideals and goals a youngster should have. Thus it is the peer group that has become the individual's source of direction, whose reactions have become important, whose approval must be obtained. Being popular with one's age group is a primary value. It is even more to be sought after than fame achieved through competitive activity. Social security has become one aim of education. The child, of course, senses the lack of self-confidence in his parents, he senses that the parents see in him at least a potential equal, if not a future superior. He realizes that the parents' knowledge is limited and that they, too, make mistakes. As a matter of fact, American parents, teachers, and other authorities feel that this realization is necessary for the sake of the children's feelings of security and early adult independence. Instead of learning to obey blindly, without questioning the adult's judgment, as one does in Europe, the child here is encouraged to use critical thinking in the hopes that his reasoning will become "autonomous" or "interiorized" as Piaget (4) calls this quality of objective, independent thinking.

Many an incident could be told by a person who has lived both in Europe and in the United States to give evidence of the differences in child development and behavior resulting from the respective differences in objectives and modes of training. A European child is a guest of his parents: a permanent guest, it is true, but one who will be asked to leave the dinner table if his behavior is not quiet and respectful. A European school child told this investigator that his father made the best pancakes when the fact was that the father, a scholar who was all thumbs in the kitchen or shop, would have difficulty boiling water. Contrast this with the American father who said that he believed he should treat his child as a potential equal (if not superior), and that their home belonged to children and parents together; or the director of a Congregational church school in Illinois, who, when asked by his five-year-old son if there was a God, though a firm believer himself, answered that some people believed in God, while others did not. He wanted his boy to decide independently in all matters possible, rather than to assume that his father was always right.

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Good preschools in this country are geared toward an education for independent thinking as well as for group living. Perhaps because of the marked difference in educational aims, there are but few preschools in Europe. There the "bébé" is expected to look to his mother for guidance. It is held that he does not need to start his social education at such an early age. In our preschools children are encouraged to find their own solutions whenever they are able to, even if these are not as perfect as adults'. At a young age this is possible mainly in concrete, practical matters, be it in regards to their work or to social living. In most preschools there are fewer rules and regulations for the older than for the younger group. The older ones are supposed to make their own decisions. To give an example: There is usually a rule for the younger group, that rubber or boots have to be worn outdoors on days when there are puddles on the playground. There often is no such rule for the older children. They have become old enough to realize that they must put boots on only if they want to play in puddles. They may choose to play where it is wet or where it is dry. Thus they may decide whether to wear boots or not.

Whereas the European school is concerned mostly with academic learning and little with cooperation or "character education"—the latter being the home's responsibility, a principal at an elementary school in Winnetka, Illinois, stated to the author that the school's primary functions are to teach children independent thinking and the skills necessary for living together. The teacher's role in this country is then, according to this informant, different from that of the European teacher. His obligation is to make the children realize that they are his potential equals. Children owe less respect merely to the teacher's role. They should be discerning enough to respect only a person who merits respect. Children should be made aware of the fact that their teachers sometimes err, and that their teacher's judgment is not always better than their own. Quite in contrast to the powerful European teacher, the more informal American teacher does not need to be feared and hated. He has become, in Riesman's words, a "peer-group facilitator and mediator."

Many observations in European and American schools give evidence of an earlier cooperation among children here. In Europe the child is often told to work individually; here, the children are encouraged to help each other, be it directly or by constructive suggestions and criticism. At an age when the European kindergartner uses "egocentric" speech, according to Piaget (3), the American one needs speech mainly for real peer communication.

A question which comes to the fore when studying differing rates of social development is whether, in a culture which values cooperation among children more than dependence upon adults, *social conscience* matures earlier due to stress on skills necessary for group life. Does the child's conscience remain "egocentric" longer in an inner-directed society than it does in an other-directed society? It is quite possible that the relatively early

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independence of the American child causes his conscience to develop not only from identification and interiorization of the ethical values of his parents, but also from the values of those of his peers to whom he has, in part, transferred his dependence. Is this "inner-directed child" older than his "other-directed" opposite number before he stops basing his moral judgments on the outcome of the subject's actions alone? As Piaget states, the young child is anxious to "expier par sanction" (to unburden his conscience of its sense of guilt by undergoing punishment). This atonement is relevant to his own needs only and is entirely unconnected with those of the victim. It is a childish expiation chosen in order to re-establish the offender's inner balance because his deed has "destroyed the equilibrium of the world." The worse the deed then, even though it be an accident and possibly due to excellent intentions, the more disagreeable must the punishment be to absolve the child's conscience. The question which we are raising here would also suggest that an "inner-directed child" must be older than an "other-directed child" before he bases his moral judgments not only on the effects of the deed but also on the feelings of the victim and on the offender's intentions.

One wonders whether these findings of Piaget are true for all children in the civilized world. There might be a difference in the rate of formation of the conscience as well as in its content when one compares children in the United States with those in Calvinist Switzerland. One might expect a different type of conscience here where education is directed outwardly rather than inwardly, where ideals, goals, and values are geared primarily toward social adjustment and not toward character improvement or toward perfection of the soul for the sake of salvation. Possibly the values of an outer-directed conscience are easier for a human being to achieve than are those of an inner-directed conscience. Perhaps this is another reason why the American child's conscience may become autonomous earlier. It requires less introspection. It is less inwardly turned in its self-evaluation, less self-concerned, less perfectionistic. Thus it becomes less destructive to his self-confidence, less guilt- and shame-ridden than is the conscience of the Swiss child who has been taught to struggle continually against his own tendencies toward wrongdoing. According to Riesman, however, Americans replace the inner-directed person's specific guilt feelings with diffuse anxiety, which he maintains is necessary to build up in the individual that emotional sensitivity to the feelings of others which will serve as a much needed facilitator of social adjustment.

## PROCEDURE

This investigation grew out of an earlier study of the author's in which we used Piaget's "*méthode clinique*"—talking to individual children, telling stories, and asking questions designed to reveal their reasoning at different age levels. The original purpose of the research was quite different in nature from the study reported in this paper. At no time during the original

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investigation was it meant to be a comparative one. When the European data were gathered the author knew very little about the United States, its people, its culture, and its education. However, when gathering the American data in Winnetka, it became clear that significant comparisons could be made between children of the two cultures. The investigator has interviewed 261 children from kindergarten through high school, 80 Europeans and 181 Americans. In all, 12 stories have been used. This paper, however, reports on just two stories, used in elementary schools only.

### *Subjects*

Europe: Twenty-nine French-speaking Swiss children, attending elementary school, which goes to tenth grade, in a rather run-down neighborhood in Geneva. United States: Forty American children, attending elementary school in Winnetka, a well-to-do suburb of Chicago.

One might wonder whether the results of this study were influenced by the difference in socioeconomic background between the children living in the United States and those in Geneva. However, results obtained, with the same stories, from 10 upper middle class German children living in Berlin were quite similar to those obtained from the Swiss children. This would seem to indicate that the phenomenon we are studying here is due more to the cultural structure of the society in which a child grows than it is to his socioeconomic class.

### *First Story—The Scoutleader's Birthday Party*

"A group of children X years old (the subject's own age)" want to give a surprise birthday party to their scoutleader. One boy has accepted the responsibility of decorating the room. He wonders whom he could ask for advice." (The questions which follow are illustrative of the type used. Actually, in the "méthode clinique," the investigator probes and probes, formulating each question on the basis of the answer the subject has given to the preceding one; thus a uniform questionnaire is not employed. In the course of this probing the experimenter asks a large number of questions. The few here quoted are deemed sufficient to indicate the nature of the questions used.)

1. "Whom do you think he might ask?"
2. "He had thought of asking his home-room teacher, a whiz in English, history, and arithmetic, who knows nothing of art, or to ask another student who is so artistic that he has won a scholarship to the museum's art classes. Whom do you think he decided to ask?"
3. "He did ask both, and their advice differed. Whose advice do you think he followed?"
4. "He thought both ideas were equally good. Which one do you think he followed?"
5. "If he chooses the student's idea, will he be very embarrassed toward the teacher whose advice he did not follow?"

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### *Second Story—Fight*

"Two boys had a fight before school to see who was stronger. Louis hit Marc's nose which started bleeding profusely."

1. "How do you think Louis felt about it?"
2. "Louis felt guilty and wanted to get rid of his bad conscience. He knew that if he asked his teacher what to do the teacher would tell him to write one hundred times: 'I should not fight before school,' whereas another friend would advise him to give his favorite toy to Marc. Do you think he asked the teacher or the friend?"
3. "Why?"
4. "Louis went to Marc and Marc told him to forget the incident: 'In a fight one child is apt to get hurt,' he said, 'I might have hurt you just as easily.' When do you think that Louis no longer felt guilty, when Marc had told him that he had forgiven him, when he had written the pages for the teacher, or when he had given his toy to Marc?"

## RESULTS

### *First Story*

Sixteen (or 69.5 per cent) of the 23 Swiss children, with whom the story was used in the above given form, all of them at least 10.3 years old, insisted that teachers and parents always give the best advice, even in matters of talent. Upon further insistence by the experimenter that it is the child who has the training particularly helpful for the scout, the Swiss children explained that adults know better because they have more experience. In the United States only three out of 40 children (7.5 per cent) preferred the teacher's advice to that of the gifted child and all three of these were six years of age. Whereas all but two Swiss children (91 per cent) imagined that the teacher would be angry if his advice was not followed, only six children in the United States (15 per cent) believed so—three were six years, two were seven and one was nine years of age. Most American children felt certain that the teacher would want the scout to follow the best advice, not necessarily the teacher's. The answers seem to show that Swiss children have less confidence in their peers than do children in America, that Swiss children continue, until a later age, to believe in the omniscience of adult authorities and to rely on their judgment, and that they are afraid of their teachers.

### *Second Story*

Only seven out of the 40 American children (17.5 per cent) showed "egocentricity" of conscience as compared to 20 out of 29 Swiss children (69 per cent). Whereas in America only two six-year-olds (5 per cent) at first thought about their expiation through punishment (though afterwards they did consider the whole situation), there were 13 Swiss children (45 per

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cent), distributed through the whole range of age, who remained solely concerned about their own atonement; another seven (24 per cent) were in a stage of transition. For many Swiss children the teacher's punishment alone re-established the equilibrium of the world, which was destroyed by their deed. In contrast to children in America, most Swiss children do not doubt the wisdom of their teacher's choice of punishment. When the investigator put these children on "the spot," questioning the teacher's judgment, a number of them became ill at ease and rationalized the teacher's action, finding some reason to justify his advice.

Rather than give up his favorite toy one American boy (2.5 per cent) and seven Swiss children (24 per cent) chose the written work. Others hated writing so much that they preferred giving away the toy. Thirteen Swiss children (45 per cent) wanted to undergo both punishments or at least the one they disliked the most to be sure of expiation. Several of these children were 14 years of age or older. In contrast, not a single American child expressed such a wish. Many Swiss children were of the conviction that some adult ought to be told of the accident even though the boys could take care of it very well themselves. One American boy thought that Louis should feel guilty, because he had not reported his misbehavior.

Being told that Marc has forgiven Louis hardly changed the Swiss children's position on needing punishment to be relieved from guilt feelings. These children again thought of the accident only from the point of view of their own expiation. None of the American children saw a need for punishment in this case.

Obviously the American children show an earlier independence from the teacher and his judgment than do the Swiss children; rather than assent to his wisdom they see the accident with more objectivity and accept the idea either that Marc is right and no guilt feelings are necessary, or that relief from guilt should come by giving pleasure to the child whom they have hurt. Thus they can conform with peer judgment. Their conscience becomes interiorized and autonomous at an earlier age than does that of the Swiss children. It is also a different type of conscience as pointed out before.

#### SUMMARY AND CONCLUSIONS

Twenty-nine Swiss children and 40 American children from 6 to 15 years of age were studied by the "méthode clinique" to determine the differences in rate of social development and in content of conscience. The study appears to have uncovered evidence that, in certain areas of social development, the American child matures earlier than does the Swiss child. The American child seems to transfer his parent dependence to a peer dependence at an earlier age. One result of this earlier transferring appears to be that the American child's conscience becomes less egocentric and interiorizes earlier than does that of the Swiss child. There is, however,

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some indication that the content of conscience differs in these two types of societies. Whereas the American child's conscience is turned, primarily, toward social adjustment, the Swiss child's is geared toward character improvement.

Within the age range studied, this study seems to support the following conclusions: (1) American children are emancipated from their own adults at an earlier age than are their Swiss counterparts. (2) They are less subjugated to adults. (3) They are, rather, more dependent on their peers. (4) They enjoy freedom of thought and independence of judgment at an earlier age. (5) They develop earlier a more highly autonomous, though less complex, conscience.

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## INVESTIGATION OF AREAS OF DISAGREEMENT IN SOCIOMETRIC MEASUREMENT OF PRESCHOOL CHILDREN

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Sociometric research has been concerned primarily with groups of school-age children. Yet no secondary group is more important to the development of a child's ways of interacting and, perhaps, his self-concept, than the earliest stable peer group, the nursery school.

Among the relatively few sociometric studies of preschool children there has been great disparity both in method and results. The purpose of this study was, therefore, to investigate areas of disagreement and omission by means of an adapted sociometric method which incorporates both choice and rejection into a single index of status.

Disagreements have arisen in every phase of sociometric research, among them the question of validation. In relation to the present investigation, an important point has been whether or not nursery school children have or can express preferences among their peers. The fact that subjects do respond has been adequate evidence for many investigators. Jennings (6) and Pepinsky (17) point out that sociometric choices, being direct measures of preferences, differ from many standardized tests, which are indirect measures of psychological processes, and thus require no validation against outside criteria. Other investigators, such as Hagman (5), Frankel (4), Moreno (11), and Emerson (3), have attempted a measure of validity by comparing verbal choices with observed contacts. Only Emerson, who used the adapted sociometric method employed in the present study, found a high degree of agreement between these variables. Both Hagman and Frankel found low correlations, but they came to differing conclusions: Hagman questioned the validity of sociometric testing on the preschool level; Frankel, on the other hand, believed that the two measures reflected two aspects of, rather than the identical, social phenomenon, pointing out that some children who had been chosen verbally were inaccessible on the playground. The same point of view was expressed by Emerson, who noted that "contacts" involved any observed interactions among children, including those not desired as well as those sought. Similar reasoning may explain the differences in results reported when teacher ratings of children's status were compared with the subjects' verbal choices. Koch (8) found a high positive correlation, while Lippitt (10), using the same methods, found a low degree of agreement.

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<sup>1</sup> This article is based on research conducted for a thesis which was submitted to Cornell University in partial fulfillment of the degree of Master of Arts (2). The writer wishes to express her gratitude to Dr. Mary Ford, who supervised the research, and to the staff of the University Nursery School, under the direction of Miss Mary Barrett.

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Secondly, there arises the question of consistency: Are preschoolers' verbalized reactions to their peers stable or merely expressions of the moment? There have been relatively few sociometric studies, of any age level, giving retest results; an exception is Northway's (14) reporting rank order consistency over a period of months in two studies of nursery school groups.

A third area of controversy concerns the ability of young children to differentiate levels of preference. Moreno (11) questioned this ability, observing that her subjects usually made a first choice but seemed unable to make second or third choices. Her findings may have been affected, however, by the wide age range of her subjects, from two to five years, and the fact that they had been together as a group only one month. Frankel (4) also concluded that her nursery school subjects did not discriminate among their preferences on the basis of comparing rank order results when weighted and unweighted scoring systems were used. Her analysis yielded a rank order coefficient of plus .98 between the rankings by the two methods. Both analyses were based on a sociometric method requesting only positive choices.

Differences in methods of securing and analyzing sociometric data have occasioned controversies over and misinterpretations of test results. Those researchers following the original Moreno (12) method present the patterns of choices through diagrams, or "sociograms," and define status in terms of individual position such as "star" or "isolate." Thompson, *et al.* (18), believe that such categorizations are more absolute than warranted by observation of actual contacts and that the variable, social acceptability,<sup>2</sup> should be thought of and expressed as a continuum, derived from various statistical and psychological data. A continuum of scores in rank order has been developed by Northway (13) by assigning weighted values to positive choices. Results are then described in terms of quartile ranks. Northway (15) found, however, that the children in the lowest quartile had only the common characteristic of being unaccepted; in behavior they ranged from recessive through socially uninterested to hostilely aggressive. Lemann and Solomon (9) attributed this result to the method of securing only positive choices; a more accurate grouping is obtained, they believe, through the incorporation of rejections. Similarly, Thompson and Powell (19) were interested in distinguishing between the "social nonentity" and the "socially rejected" child.

The incorporation of rejections has caused a reconsideration of terminology in describing the results of sociometric tests. When only positive choices were elicited, low scorers were sometimes labeled "rejected." Bronfenbrenner (1) and Northway (16), however, found that some subjects in the low status group, of a choice-only test situation, are "neglected" or

<sup>2</sup> Northway (16) has pointed out that the term "acceptance" rather than "acceptability" should be applied to an individual's score, for his rank in one group cannot safely be predictive of his general acceptability in other situations.

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"isolated" rather than "rejected." The differentiation of a rejected from "non-chosen" or "not noticed" child has been made in several adaptations of sociometric method with elementary, secondary, and college groups (7, 9, 19). In order to secure both choices and rejections from a preschool group, Emerson (3) asked the subjects whom they liked to play with and whom they didn't like to play with. Unlike the methods of previous investigators, "forced," or specifically elicited, choices were included to differentiate between those children who were disliked and those who were not noticed. This system, in which a single score derived for each subject is rank-ordered in a continuum, was utilized in the present study.

### THE PROBLEM

The following questions, based on areas of disagreement, were investigated by the writer by means of Emerson's adapted sociometric method:

1. Are there demonstrable preferences among the preschool subjects?
2. Are the subjects' verbalized preferences stable?
3. Are levels of preferences differentiated by the subjects?
4. Does the use of a method which secures rejections result in status groups with different memberships from those obtained by the choice-only method?
5. Are high and low status children more "noticed" than the children in the middle status group?

### SUBJECTS

The subjects of this study, the entire senior group of a college laboratory nursery school, were 15 children, seven boys and eight girls. Their ages ranged from four years one month to five years one month. All the children had been in attendance at least one semester previous to the term in which the study was conducted; four children had attended for two prior terms, three had been enrolled for three terms, one for four terms, and five had been in the group for five semesters before the study. The fathers of all the children were business or professional men.

### PROCEDURES

Within a period of eight consecutive days each subject had an individual sociometric interview with the writer immediately after separation from his parent on arrival at the nursery school. A child was tested before he had joined his group for the day in order to elicit responses based on accumulated experiences rather than those occasioned by proximity or temporary reaction.

Rapport was initially established by introducing a simple puzzle for the child to assemble, the sociometric questions beginning when the child felt at ease. To secure the environmental set, the first question was, "What do

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you like to do best at Nursery School?" After accepting the response, the interviewer requested positive choices with the question, "Whom do you like to play with best in Nursery School?" To secure three choices, the child was asked, "Anyone else?" "Anyone else?" Rejections were requested in the same manner, with the question, "Whom in Nursery School *don't* you like to play with?" The subject was then asked whether or not he liked to play with each of the children whose names he had not volunteered, these being termed "forced" responses. The complete verbalization during the interview was recorded.

A retest was made in 60 days using the same procedures.

Numerical weights were assigned to the responses as follows: The first "spontaneous" choice and rejection each was given 14 points (plus for a choice and minus for a rejection), based on each child's having one out of 14 chances of being named first in the group of 15 children. Because some children gave two responses when asked "Anyone else?" it was necessary to distinguish between plural and single responses. Thus, 7 points, plus or minus, were given for second choices and rejections, and 5 points for third responses. If two responses were made together, each received the full value. "Forced" responses were given 1 point each, plus for "Yes" and minus for "No."

The positive and negative points received by each child were summed, giving him a single score which was then rank ordered with the scores of the other subjects. A division was made into three groups; the low group was composed of those children whose scores were below the first quartile, the middle group comprised the interquartile range, and the high group those above the third quartile.

## FINDINGS

The findings are presented in terms of the questions raised earlier.

### 1. *Demonstration of Preferences*

Fourteen of the 15 subjects responded to the sociometric questions; all gave some spontaneous responses. Two children gave three spontaneous choices, as requested, while two subjects made four choices without additional solicitation; five children made two spontaneous choices; and five gave only one choice on the original test. For spontaneous rejections, five children gave three names; six gave two responses; one subject rejected only one child; and two children gave no negative responses. Twelve of the children made comments during the test in terms of giving reasons for their choices or rejections, adding emphasis or elaboration to their responses, or volunteering specific incidents about the child named. Examples of the recorded verbalization are as follows: "She has been away a long time," accompanying a spontaneous choice; "I guess I like him; I haven't played with him much," to a forced choice; and, with a rejection, "She doesn't

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like me one bit, so I don't like her!" Several stated, "That's all I like," or, "She's the only one I like best."

One child was absent during the first six days of the original test and present during the retest, yet the choices she received put her in the high status group on both tests.

Scores received by the subjects, as recorded in Table 1, ranged from plus 70 to minus 34 on the first test, indicating wide differences in choice behavior. The mean score for the entire group was plus 9.1 points. Means for the status groups were: high group, plus 44.0; middle group, plus 7.3; and low group, minus 22.5.

TABLE 1  
SUBJECTS' SOCIOMETRIC TEST SCORES AND RANKS

	Choice Points (plus)		Rejection Points (minus)		Total Points (disregarding sign)		Status Score		Rank	
	Test	Retest	Test	Retest	Test	Retest	Test	Retest	Test	Retest
Pat . . . .	70	30	0	0	70	30	70	30	1	3
Babs . . .	46	46	2	2	48	48	44	44	2	2
Sue . . . .	41	29	2	3	43	32	39	26	3	4
Don . . . .	26	67	3	13	29	80	23	54	4	1
Paul . . .	22	7	3	5	25	12	19	2	5	9
Fred . . .	21	8	4	4	25	12	17	4	6	8
Jane . . .	16	27	3	9	19	36	13	18	7	6
Ruth . . .	13	5	8	12	21	17	5	-7	8	10
Evie . . .	20	42	19	35	39	77	1	7	9	7
Bob . . . .	6	3	7	13	13	16	-1	-10	10	11
Mary . . .	13	23	16	2	29	25	-3	21	11	5
Alan . . .	3	2	9	14	12	16	-6	-12	12	12
Ken . . . .	11	27	32	43	43	70	-21	-16	13	13
Joan . . .	31	44	60	63	91	107	-29	-19	14	14
Dale . . .	33	32	67	86	100	118	-34	-54	15	15

The high percentage of response to the sociometric questions, together with the unsolicited explanatory verbalization, the recall of and response to absentees, and the wide range of scores give evidence that the subjects of this study not only had but could verbalize preferences.

An outside criterion was obtained through the Nursery School teacher's independent ranking of the children into three status groups. Her grouping was in 75 per cent agreement with the results of the sociometric test.

## 2. Stability of Preferences

The sociometric test procedure was replicated after 60 days. The rank order coefficient of correlation between the original and retest rankings was

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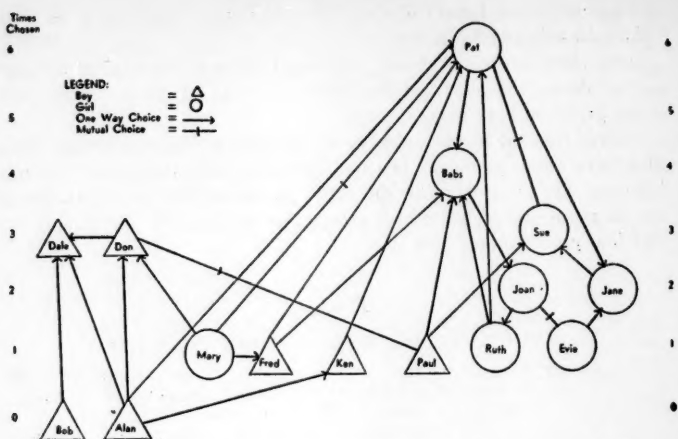


FIGURE 1—Sociogram of positive spontaneous and free choices—original test.

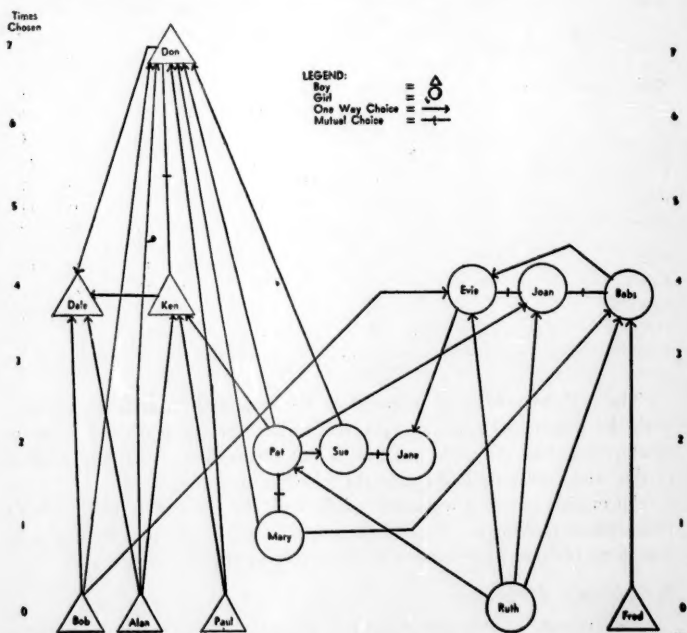


FIGURE 2—Sociogram of positive spontaneous and free choices—retest.

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plus .86. The rankings of each child on both tests are listed in Table 1. The membership of the three status groups remained constant; although the rankings within the high and middle groups changed, the rank of members in the low group did not change.

It may be seen from the sociograms, Figures 1 and 2, that individual choices changed from the test to the retest, yet most subjects' relative positions in the group remained remarkably unchanged, when both choices and rejections were compiled. Therefore, among the subjects of this study, sociometric status, rather than individual preferences, was consistent.

### 3. *Differentiation of Levels of Preference*

Following the method used by Frankel (4), the writer compared the rank order of the subjects derived from the weighted scoring system used in this study with the rank order obtained when all choice levels were given equal value. Only 53.3 per cent agreement was found. Subjects were also ranked by arbitrarily weighting the choices and rejections 8, 6, 4, 1; agreement between this arbitrary system and the one used in the present study was complete with one exception: two children, at sixth rank, received identical scores. In this group, therefore, it seems that levels of preference do exist and are being measured by a choice-rejection test form and weighted scoring system.

### 4. *Comparison of Results Including and Excluding Rejections*

It can be seen from the sociograms, Figures 1 and 2, that when only choices are considered, the membership of the high status group would be greatly different. On the first test the high group would include Dale, whose total choice and rejection scores put him at the bottom of the low group on both tests. On the second test three low status children would appear as high group members. Although a cutting point for status groups would have been difficult to determine with the choice-only points, a number of children might have been accorded "low" status on the basis of their receiving only one spontaneous choice on the first test. Actually, however, several of these children, including Bob, who received no choices, were actually neither greatly rejected nor chosen; they were just "not noticed." Comparing the rank order obtained when only positive choices are considered with that found in this investigation results in a rank order coefficient of correlation of plus .53 for the first test and plus .39 for the retest.

When the choice-only method is considered, the group membership in the retest differs greatly from that of the original test. In the high group, only one child would rank high on both tests; only two are found in the low group on test and retest; and three out of seven remained unchanged in the middle group.

It is found, therefore, that there is a great difference between results obtained by the two methods and less consistency between test and retest groupings with the choice-only method.

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### 5. *Comparison of "Notice" Scores*

When the total points, disregarding plus and minus signs, were considered, it was found that six of the eight children in the high and low status groups received considerably higher total scores than those in the middle group. As can be seen in Table 1, the two subjects (Don and Alan) who ranked nearest the middle group in the high and low group, respectively, had "notice" scores which fell within the range of scores of middle group members. The means of the "notice" scores for the three groups were: high group, 47.5; middle, 24.4; and low, 61.5. This suggests that high and low status children are found to be more noticed, spontaneously chosen or rejected, than those of the middle group.

### DISCUSSION

The analysis of the data by both the choice-only and the choice-rejection methods resulted in great differences in terms of test-retest consistency, differentiation of preference levels, membership in status group and the consequent labeling of individuals. This strongly suggests that method may be a basic variable underlying areas of disagreement in sociometric research, and it is the conclusion of this study that sociometric status is not accurately measured by a system which does not include rejections and "forced" responses. For example, the securing of only positive choices in the Northway (15) study may have grouped within the low quartile those children who, in the choice-rejection system, would have been separated into the middle (or "not noticed") and the low (or "rejected") groups. The present findings may relate, also, to the discrepancy noted by Frankel (4): that those who received high status in terms of test choices were not observed to be the most chosen on the playground. In the choice-only analysis of the data in the present study some children appeared in the high group who, when rejections were also considered, ranked in the low status group.

The question of terminology, while clarified by the present study, is not satisfactorily resolved. While the terms "most chosen" for the high group, "not noticed" for the middle group, and "rejected" for the lows are more accurately measured by the choice-rejection method, some differences are still obscured. For example, some members of the middle group had moderately high "notice" scores, although the summing of positive and negative points ranked them in the middle status group. Some low group members were actually both highly rejected and highly chosen, the former outweighing the latter in terms of points.

Although not specifically measured by this study, several other factors may have affected results: namely, standardization of procedures to minimize transient responses and the testing of subjects whose period of acquaintance was relatively long term and who were within a one-year age range.

Further research is greatly needed to discover the behavioral variables related to choice or rejection by peers. It was found in the present study

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that, although individual choices and rejections changed from test to retest, the identical subjects comprised the three status groups. That many of the subjects were cognizant of others' reactions toward them was apparent from their recorded verbalizations during the test situation.

### SUMMARY

The purpose of this study was to investigate certain points of disagreement in the area of preschool sociometric research. Data were derived from a study of 15 children, age four and five, attending a college laboratory nursery school. An adapted sociometric method was used which included a standardized interview situation; measurement of choices, rejections, and "forced" opinions; a weighted scoring system; expression of results in terms of individual scores rank-ordered in a continuum; and replication of the procedure after 60 days. For comparative purposes, three groups were designated: the low group consisted of those children who scored below the first quartile; the middle group were those children within the inter-quartile range; and the high group ranked above the third quartile.

Findings relevant to the problem areas investigated were as follows:

1. The subjects had and were able to verbalize preferences among their peers.
2. Individual statements of preferences changed but membership within status groups remained identical from test to retest. Rank within the high and middle groups shifted, but the low group subjects maintained their relative positions. The rank order coefficient of correlation between the original test and retest was plus .86.
3. The subjects of this study appeared to differentiate levels of preference.
4. Results derived by the present method differ from those of the "choice-only" method; the rank order coefficient of correlation between the two methods was .53 on the first test and .39 on the retest.
5. The majority of the subjects in the high and low status groups had higher "notice" scores than those in the middle status group.

There is evidence that the method used in this study brought out a fuller, and more consistent, sociometric group description than is obtained in the choice-only system.

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## BEHAVIORAL DIFFERENCES OF SOCIOMETRIC STATUS GROUPS IN A NURSERY SCHOOL

MARGARET JENNE DUNNINGTON<sup>1</sup>

The purpose of this study was to investigate certain behavioral differences between those children who were most chosen and those who were most rejected by their peers in a nursery school group. The research was designed to provide quantitative measures of the behavioral and sociometric variables in order that the method might be applicable to other groups for replication and extension of the area of investigation.

It has been found by other researchers that young children do have preferences among their peers (4, 5, 9, 11), and both the present study and the Budden study reported by Northway (11) found that these preferences show a high rank order consistency over a period of months. There has been little agreement, however, about the characteristics of children who achieve high or low status in this earliest stable peer group experience. Most of the studies, including those of school age children, have investigated the relationship of sociometric status to background factors, such as propinquity, age, and family data (2, 4, 6), or to personality variables such as intelligence, behavior within the group, and motor abilities (4, 5, 7, 8, 9). The behavior variables have been measured primarily through observation of a group in a nonstandardized setting, with the exception of Moreno (9), who observed interaction between experimental pairs. No reports were found in which individual performance measured in a controlled experimental situation was the dependent variable. In order to meet the need both for method and information the present study was undertaken, utilizing a set of play materials for the experimental medium.

### THE PROBLEM

It was hypothesized that significant differences would be found between children of high and low sociometric status in various aspects of their aggressive, imaginative, and verbal behavior when measured in a stand-

<sup>1</sup> This article is based on research conducted for a thesis which was submitted to Cornell University in partial fulfillment of the degree of Master of Arts (3). The writer wishes to express her gratitude to Dr. Mary Ford, who supervised the research; Miss Shirley J. Heinze, partner in the play experiment; and the staff of the University Nursery School, under the direction of Miss Mary Barrett.

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ardized situation. Specifically, the following aspects and directions of the variables were hypothesized:

1. *Aggression.* It was expected that all subjects would behave aggressively, but that statistically significant differences would be found in the type and direction as follows:

a. The proportion of positive affect to negative or aggressive affect would be greater among the high status group than the low status children.

b. The proportion of aggression which was specific as to origin and object would be greater in the high than the low status group.

c. The proportion of aggression which occurred within the context of an ongoing, goal-oriented theme would be greater for the high than the low status children.

2. *Imaginative use of materials.* It was expected that all subjects would use the play materials in some sort of design or active play, but that they would differ in their emphasis as follows:

a. The proportion of their physical nonthematic use of the materials in which organization was realistic would be greater in the high status group than in the low.

b. The proportion of nonthematic play which was mere handling of the objects without relationship to other materials would be lower in the high group than in the low group.

c. The proportion of their thematic play with the materials which was within the context of ongoing, goal-oriented themes would be greater for the high status than the low status children.

3. *Verbal interaction with adult.* It was expected that all subjects would talk with the adult during the experiment, but that they would differ in purpose, spontaneity, and response.

a. The proportion of their verbalization which was directed toward seeking interaction with the adult would be smaller for the highs than for the lows.

b. The proportion of their verbalization which was spontaneous, or unsolicited by the adult, would be greater for the highs.

c. The proportion of the adult's verbal stimulation to the child which was rejected by the child would be lower in the high than the low group.

## SUBJECTS

The subjects of the study were 15 children, seven boys and eight girls, comprising the senior group of a college laboratory nursery school. The age

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range at the time of the study was four years one month to five years one month. All the children had been in attendance at least one semester previous to the term in which the study was conducted; four subjects had attended for two prior terms, three had been enrolled for three terms, one for four terms, and five had been in the group for five semesters before the study. The fathers of all the children were business or professional men.

### PROCEDURES

#### *The Sociometric Test*

Sociometric status was derived by the interview and scoring methods developed in the Department of Child Development and Family Relationships at Cornell University; these methods were adaptations of the original Moreno (10) sociometric technique. In individual interviews the subjects were asked to name children in their group whom they "like best to play with" and whom they "don't like to play with." By asking "Anyone else?" "Anyone else?" the interviewer attempted to secure three choices and three rejections from each child. The subject was then asked whether or not he liked to play with each of the children who were not spontaneously mentioned. The subjects' complete, and often ingenious, responses were recorded. In order to secure responses of accumulative rather than temporary nature, subjects were interviewed immediately upon their arrival at the nursery school before they had seen any other children.

A retest was conducted using the same procedures 60 days after the original set of interviews.

The scoring procedure consisted of assigning weighted values to the responses. This procedure assumed that the subjects expressed levels of preferences and was based upon the writer's experience that the majority of children gave explanations for their rankings and considered their replies carefully. In addition, subsequent comparison of the rank order resulting from the weighted scoring with that from using equal values for all responses showed only a 53 per cent agreement between the two systems.

The following weighted values were used. A first choice and rejection received 14 points, plus for a choice and minus for a rejection, based on the premise that in the group of 15 children each had one out of 14 chances of being chosen first. The second choice or rejection received 7 points, plus or minus. The third choice was given only 5 points because some subjects added spontaneously, a fourth choice, which was given 3 points. The specifically elicited or "forced" choices were each given 1 point, plus or minus.

A single score was found for each subject by summing the positive minus the negative points he had received. The subjects were then rank-ordered and the group divided into three status groups, high, middle, and low.<sup>2</sup>

<sup>2</sup> Additional details concerning procedures can be found in the writer's thesis (3).

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### *The Play Experiment*

Fourteen of the subjects participated in the play experiment. Each child had three sessions with a specially constructed set of 60 semirealistic wooden toys, including people, animals, buildings, vehicles, trees, and fences, to which was added a commercial flexible-bodied doll family. The toys were presented, unorganized, in a large, flat box. The first session, of 10 minutes' duration, was intended to familiarize the subjects with the toys and the setting; although it was recorded, this first run was not included in the analysis. The second and third sessions were 20 minutes in length. All sessions were held in a minimally furnished room in the presence of the experimenter and the observer. The time interval between sessions was, with a few exceptions, one week, each subject being taken from the nursery school at approximately the same hour for all three sessions. A verbal record was secured by tape recording.

The experimenter's interaction with the child was predominantly non-directive, responsibility for the play being solely with the child. The adult's comments fulfilled three purposes: to create an accepting atmosphere, to secure the child's verbalization of his play when it was not spontaneously given, and to attempt to keep his attention focused on the materials when he became tangential. The observer avoided interaction, insofar as possible.

Initial structuring for the child was given en route to the experimental room and consisted of telling him that there were some new toys for him to play with while the experimenter and the observer did their work. He was also told that he would have only a short time to play that day but could have longer another time. In the experimental room the toys were pointed out and the child was told that he could play with them now as he wished. One minute before the end of the session the experimenter stated that she was almost through with her work and that they would return to the nursery school shortly. No child was forced to remain for the full period, although he was given encouragement to continue his play, and all children were permitted to effect closure if they desired.

Observations were recorded on score sheets in predetermined categories. Resembling those of Bach (1), the categories were developed from analysis of stenographic records of pretest subjects' play behavior and were designed to cover all the subjects' actions and verbalizations. One group of categories dealt with the physical use of the materials: exploration, abstract organization, realistic organization, placement, manipulation, generalized thematic, routine thematic, original thematic, and nongoal thematic. The remaining categories covered the child's interaction with both materials and adult in terms of giving or seeking, accepting or rejecting: attention, help, information, instruction, permission, structuring, positive affect, attacking, blocking, criticism, threat, tangentiality, withdrawal, closure, and negative affect. The categories used for recording the experimenter's verbalizations were: acceptance, elaboration, focus, direction, information, help, assignment of responsibility, and criticism.

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All the materials were given codes for ease of recording. Each behavior unit, defined as a change in direction of ongoing activity or object, verbal or manipulative, was recorded by putting the material code in the appropriate category row on the score sheet. Direction was designated in the interaction categories by coding the initiator of the behavior, the type of interaction (giving, seeking, accepting, or rejecting), and the object or recipient. Each new score appeared in a new column, and an additional score was given for an activity which continued for more than 15 seconds. Scores in most of the interaction categories were double-coded with scores in the materials categories. For example, a score in the "attacks" category row might have been entered in the same column with the object codes AB (bear) and PG (girl) in the original thematic category row. Activities which were verbalized were designated by a check mark.

The number of entries in each category was totaled for each subject's two full-length sessions. Measures of the variables as set forth in the hypotheses were derived from combining related categories and scoring subcategories according to scoring conventions defined below. These quantitative measures were then expressed in terms of ratios which were computed for each subject and were treated as scores for the analysis.

### *Variables*

- |   |   |
|---|---|
| 1. <i>Positive Affect</i><br>Total Aggression                 | 6. <i>Routine and Original Thematic</i><br>Total Thematic     |
| 2. <i>Specific Aggression</i><br>Total Aggression             | 7. <i>Seeks Interaction</i><br>Total Verbalization            |
| 3. <i>Thematic Aggression</i><br>Total Aggression             | 8. <i>Unsolicited Verbalization</i><br>Total Verbalization    |
| 4. <i>Realistic Organization</i><br>Total Nonthematic         | 9. <i>Rejection of Stimulation</i><br>Total Adult Stimulation |
| 5. <i>Explore, Place, and Manipulate</i><br>Total Nonthematic |   |

The following conventions were used in scoring subcategories and combining existing categories:

1. Total Aggression was the sum of scores in the categories Attacking, Criticism, Disorganization, Threat, and Negative Affect.
2. Specific Aggression was scored when the code in one of the Aggression categories indicated that the aggressive act had been performed and received by single objects or units (ex., car hitting policeman doll).
3. Thematic Aggression included those Aggression scores which occurred in the same column with a score in a Thematic category (ex., mother doll spanking child doll double-coded in Attacking and Original Thematic categories).
4. Total Nonthematic was the sum of scores in the Nonthematic cate-

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gories Exploration, Placement, Abstract Organization, Realistic Organization, and Manipulation.

5. Total Verbalization was the sum of checkmarks.
6. Unsolicited Verbalization was scored when the checkmark was not preceded by any score in the Adult categories, or when preceded by a score in the Adult categories of Acceptance, Giving Information, and Giving Help.
7. Stimulation scores were those recorded in the Adult categories of Seeking Elaboration, Focus, Direction, and Information, and Assignment of Responsibility.
8. Rejection of Stimulation was composed of scores in the following sequences: Tangential score following Adult Stimulation, a non-verbal score following Adult Elaboration or Seeking Information, or child's response of "No" following Adult Stimulation.

Mean scores and standard deviations were computed for each sociometric status group on each experimental variable, and the differences between the means of the high and low groups were tested for significance using the *t* test.

### *Reliability*

A retest of the sociometric study was conducted two months after the original set of interviews. The rank order coefficient of correlation between the two tests was plus .86. Status group membership remained identical, although there was some shifting of relative position within the high and middle groups.

Reliability of the observations of the play sessions was determined by the experimenter's recording simultaneously with the observer for the first five minutes of each play session. Analysis of the two sets of records showed that agreement on category placement of each unit of play recorded by both persons was 87.9 per cent, while the agreement on all units, some of which might have been missed by one or the other, was 71.0 per cent. Reliability was computed for the Adult categories in the same manner, yielding 91.7 per cent and 81.8 per cent agreement, respectively.

## FINDINGS

Analysis of the mean scores on all variables yielded differences in the directions hypothesized. The means, standard deviations, and levels of significance are listed in Table 1. For the three Aggression variables and the three Verbalization variables, the differences between the high and low groups were significant above the 5 per cent level of confidence, while the three variables concerned with the Imaginative Use of Materials differentiated between highs and lows only at the 10 and 20 per cent levels and thus did not meet the criterion of significance.

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TABLE I

MEANS AND STANDARD DEVIATIONS OF SCORES ON EXPERIMENTAL VARIABLES FOR CHILDREN IN HIGH, MIDDLE, AND LOW SOCIOMETRIC GROUPS AND LEVEL OF SIGNIFICANCE FOR DIFFERENCES BETWEEN HIGH AND LOW GROUPS

<i>Variables</i>	All Subjects		High Group		Middle Group		Low Group		<i>Level of Significance</i>
	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	<i>Mean</i>	<i>SD</i>	
Positive Affect to									
Total Aggression . . . . .	.15	.18	.19	.06	.23	.21	.00	.00	.01
Specific Aggression to									
Total Aggression . . . . .	.38	.62	1.00	.00	.74	.22	.26	.09	.001
Thematic Aggression to									
Total Aggression . . . . .	.41	.30	.70	.10	.56	.15	.03	.05	.001
Realistic Organization to									
Total Nonthematic . . . .	.41	.41	.43	.08	.51	.22	.23	.13	.10
Explore, Place, Manip. to									
Total Nonthematic . . . .	.45	.18	.37	.04	.39	.16	.63	.20	.20
Routine & Original Thematic									
to Total Thematic . . . .	.63	.28	.85	.14	.64	.18	.39	.28	.20
Seeks to Total									
Verbalization . . . . .	.22	.13	.11	.04	.20	.13	.34	.03	.001
Unsolicited to Total									
Verbalization . . . . .	.63	.18	.76	.06	.63	.23	.55	.05	.01
Rejection to Total									
Stimulation . . . . .	.49	.19	.36	.13	.46	.17	.68	.12	.05

Other findings give added support to the differences in behavior when status groups are compared. The mean scores for the three status groups are in rank order on seven of the nine variables, the middle group mean being between those of the high and low groups. On the two variables, Positive Affect to Total Aggression and Realistic Organization to Total Nonthematic, the mean of the middle group is the highest value. Comparisons of the standard deviations of each group on each variable indicate the trend toward homogeneity for the high and low status members, with the middle group showing greater variability. On seven of the variables, the standard deviation of the middle group markedly exceeds that of both the high and low sociometric groups. On two of the variables, Manipulate, Place and Explore to Total Nonthematic and Routine and Original Thematic to Total Thematic, the standard deviation of the middle group is less than that for the low status group. However, neither of these variables significantly differentiated between the highs and lows.

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### DISCUSSION

The findings of this research indicate that there are differences between the most chosen and the most rejected children in the group in terms of their aggressive and verbal behavior in experimental play situations. Although the high status children do exhibit aggression in their play, they show a greater proportion of positive expression than do the low status children. There seems to be a greater tendency for the high group to express their aggression within the context of thematic play and to have definite, single doers and recipients of the aggressive acts, when compared with the low status members. The high children have a lower proportion of their total verbalization directed toward drawing the adult's attention to themselves and a higher proportion of self-initiated verbalization than do the low status subjects. Although the low group members seek a greater proportion of attention, they reject, to a greater degree, the adult stimulation given them.

It would seem that the aggression and verbalization variables differentiate in this population between children of high and low sociometric status. However, the variables measuring imaginative behavior were all below the level of significance, indicating either the need for refinement of the variables or the possibility of no difference.

### SUMMARY

The purpose of this study was to determine whether statistically significant differences in aggressive, imaginative, and verbal behavior could be found between a group of high status children and a group of low status children in a nursery school. Two standardized situations were developed to derive quantitative measures of the behavior of 14 four- and five-year old children:

1. A sociometric test in which a full measure of status was secured through choices, rejections, and forced opinions, and
2. Three experimental sessions for each child with a set of semirealistic play materials during which behavior was recorded in terms of predetermined categories.

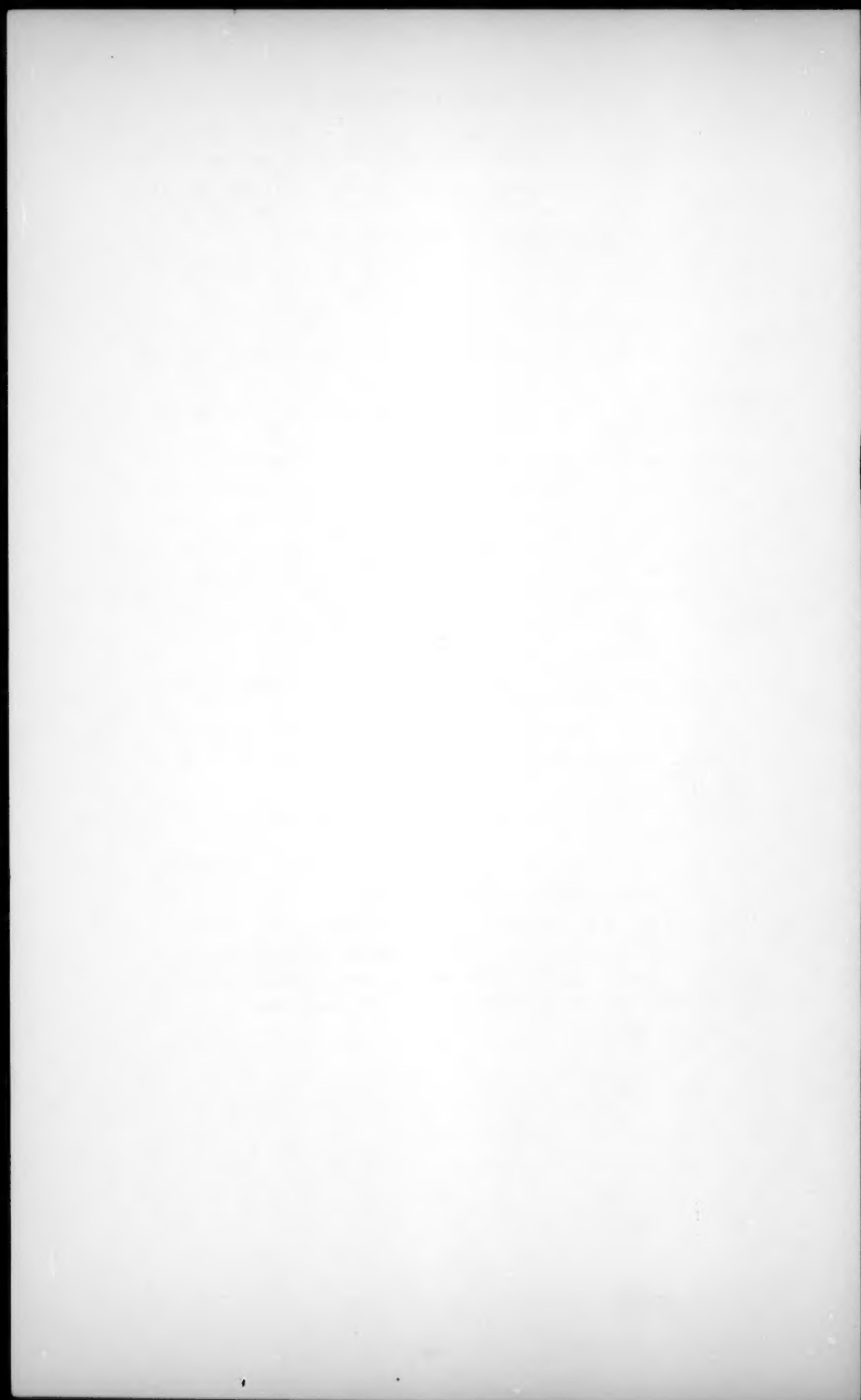
Numerical weights were accorded the various choices and rejections received by each subject to derive sociometric scores, which were then rank-ordered and divided into three status groups, high, middle, and low. Behavior scores were derived for each subject by totaling the units recorded in each category observed in the play experiment, developing ratios to test the hypotheses, and computing means for each sociometric status group. The means of the high and low groups were tested for significant differences.

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Differences between the mean scores of the high and low status groups were in the directions hypothesized. These differences were statistically significant for the three variables measuring aggressive behavior and the three variables measuring verbal interaction but did not meet the test of significance for the three measures of imaginative behavior.

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## THE LATER CAREERS OF BOYS WHO WERE EARLY- OR LATE-MATURING

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A previous study (7) compared two groups of boys who had been classified as physically accelerated or retarded, in terms of skeletal age. These groups represented approximately the 20 per cent at each extreme of a normal public school sample. The comparison showed differences in physical growth, sexual maturing, and in a number of psychological measures, and led to the conclusion that "... those who are physically accelerated are usually accepted and treated by adults and other children as more mature. They appear to have relatively little need to strive for status. From their ranks come the outstanding student body leaders in senior high school. In contrast, the physically retarded boys exhibit many forms of relatively immature behavior: this may be in part because others tend to treat them as the little boys they appear to be. Furthermore, a fair proportion of these give evidence of needing to counteract their physical disadvantages in some way—usually by greater activity and striving for attention, although in some cases by withdrawal" (p. 146).

It is clear that early- or late-maturing may have a considerable bearing upon the social life and personal adjustment of some individuals during the middle years of their adolescence. Perhaps of greater importance, however, is the inquiry as to longer-term effects or relationships in adult life, and on this point no evidence has previously been offered.

The subjects who participated in the original study are now in their early thirties. Contacts have been maintained with many of the group during the intervening years; in a systematic follow-up study<sup>1</sup> beginning in 1954 current data have been obtained for 20 of the early- and late-maturing boys, out of an original sample of 32.

### ADOLESCENT DIFFERENCES

Figures 1 to 7 present data from the adolescent period for the original groups, and for the subsamples available in the present study. Figure 1 shows the distribution of skeletal ages (at around chronological age 17)

<sup>1</sup> Acknowledgements are due to the U.S. Public Health Service for a grant in support of this study. The follow-up study was a joint project of the Institute of Child Welfare and the Donner Laboratory.

## CHILD DEVELOPMENT

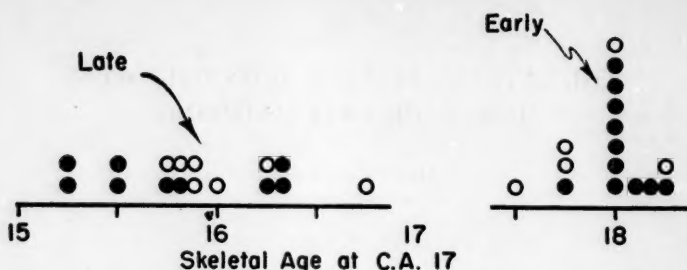


FIGURE 1—Skeletal ages at 17 years, of the late- and early-maturing.

for the early- and late-maturing. Each circle represents an individual case: the black circles those included in the follow-up and the open circles those who have dropped out.<sup>2</sup> It can be seen that the new selection has not substantially altered the maturity differential of the two groups.

Figures 2 and 3 present cumulative records for height and weight in terms of standard scores at ages 12 to 17. Standard scores (in which 50 is taken as the mean and 10 as the SD) are indicated on the left vertical axis, and percentiles on the right. In these and the following figures, the points on connecting lines represent averages for the follow-up group, consisting of 11 early- and 9 late-maturing individuals. The adjacent points denote averages for the original 16 early- and 16 late-maturing.

The early-maturing tend to fall at the 75 percentile or above, and the late-maturing at the 25 percentile or below, with differences which are at a maximum at around 14 years, when the early-maturing are on the average approximately 8 inches taller and 34 pounds heavier.

In these physical measures the adolescent data for the follow-up sample are similar to those of the original sample, and this is also shown in Figure 4, based on a measure of static dynamometer strength (right grip).

Other physical comparisons included Greulich's (6) 5-point standards of maturity (rated by physicians from pubic hair and external genitalia) and Bayley's ratings of androgeny (1). On the Greulich scale the late-maturing boys at age 14 averaged only 2.0, well below the norm; while the early-maturing averaged 4.5, or close to the scale maximum. In the androgeny assessments, the early-maturing were nearly all in the "masculine" or "hyper-masculine" zone, while approximately half of the late-maturing were classified as "asexual," "bisexual," "hypo-bisexual," or physically "dis-

<sup>2</sup> Skeletal age was assessed from X-rays of the hand and knee, using Todd standards. Of the 12 cases lost from the original sample, three have died, one has not been located, one is non-cooperative, three have been scheduled but not yet seen in the follow-up and the remaining four have moved away and are for the time being unavailable because of residence abroad, or in other states.

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# HEIGHT : BOYS

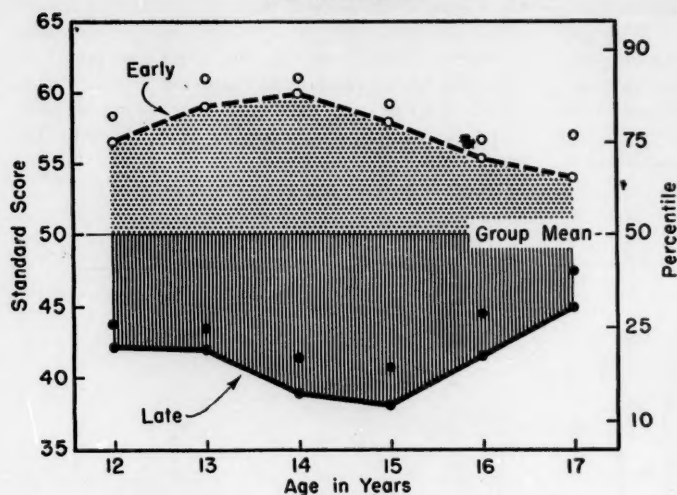


FIGURE 2—Height comparisons for two contrasting groups.

# WEIGHT : BOYS

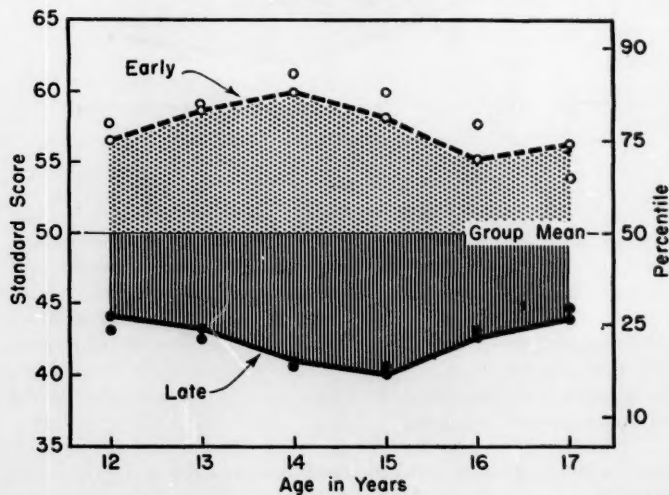


FIGURE 3—Weight comparisons.

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harmonious." In these as in other respects the follow-up samples yielded distributions similar to those of the original study.

With such marked adolescent differences in size, strength, masculine conformation, and associated athletic abilities, we might also predict, in our culture, average differences in reputational status and in some aspects of self-acceptance. In the original study comparisons were presented, at an average age of 16, for a series of ratings made in "free play" situations. The early-maturing were judged to be more attractive in physique and as

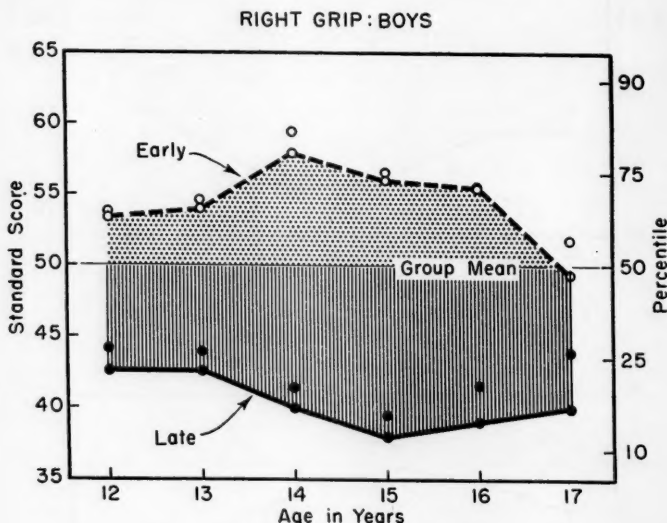


FIGURE 4—Strength comparisons.

showing more attention to grooming. They tended to be more relaxed, more matter-of-fact and less affected in their behavior. Differences were significant at the .05 level for each of these traits; for a number of other characteristics, such as interest in the opposite sex, and "good-naturedness," quite consistent differences were obtained over nine semesters of observation. The late-maturing were significantly more expressive, but their small-boy eagerness was also associated with greater tenseness and more affected attention-seeking mannerisms.

Figure 5 represents average measures for attractiveness of physique, based on independent ratings by three staff members. Figure 6 gives similar cumulative records for an illustrative aspect of expressive behavior (eagerness). The early-maturing are centered close to the average in this charac-

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"ATTRACTIVE PHYSIQUE": BOYS

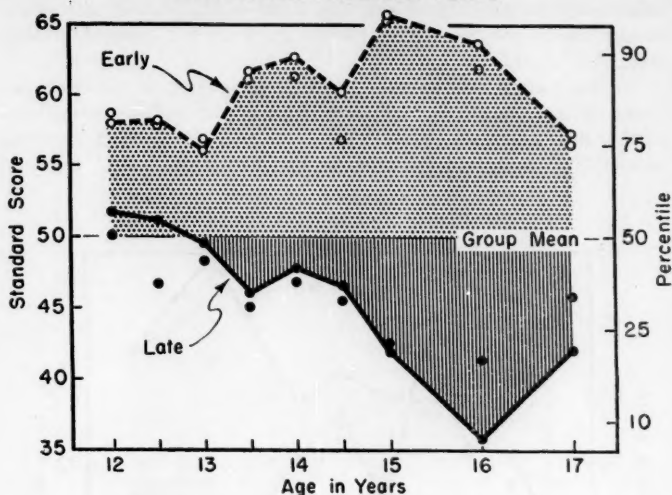


FIGURE 5—Comparative ratings of "attractive physique."

"EAGERNESS": BOYS

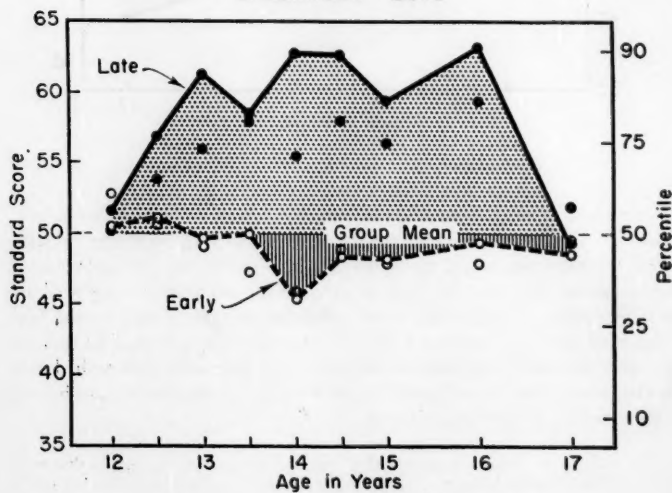


FIGURE 6—Comparative ratings of "eagerness."

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teristic while the late-maturing are judged to be more juvenile and less poised in their expressiveness, especially in the middle years of adolescence. Similar results were found for such characteristics as "animated," "talkative," and "uninhibited."

On behavior items suggesting a large component of self-acceptance (being relaxed, unaffected and matter-of-fact) the early-maturing were rated higher at the end of the study, with the late-maturing becoming increasingly "tense" and "affected" in the high school years.<sup>3</sup> Figure 7

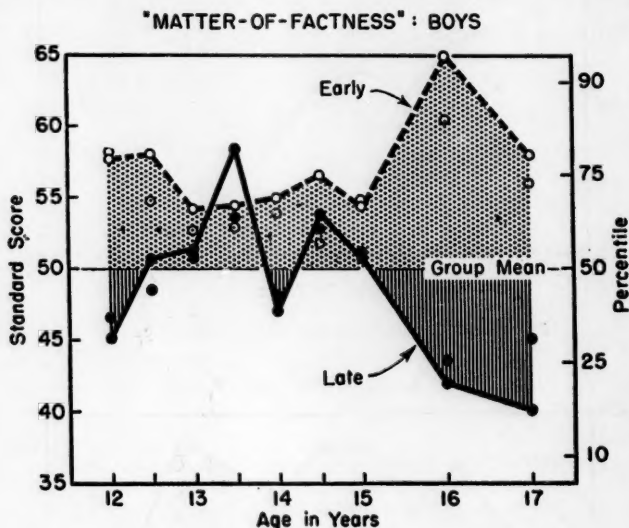


FIGURE 7—Comparative ratings of "matter-of-factness."

illustrates this for the characteristic which we have called "matter-of-fact." Both groups fluctuate around the average in this trait until age 16 when they separate noticeably, the early-maturing falling on the favorable or well-adjusted side, and the late-maturing on the attention-seeking or show-off side of the scale. Similar wide separation at ages 16 and 17 has been found for the trait "unaffected-affected" and for "relaxed-tense." In these, as in other relevant psychological measures, the follow-up groups had adolescent records similar to those of the original study; the loss of cases has not substantially changed the selection.

<sup>3</sup> A study of the Thematic Apperception Test responses at age 17 suggests that early-maturing boys tend to be more self-accepting and to feel less threatened than late-maturing. These data will be presented in a forthcoming article by Paul H. Mussen and Mary Cover Jones.

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### ADULT DIFFERENCES

We may now consider the adult characteristics of the early- and late-maturing, as observed at an average age of 33 years. As was predicted at age 17, the differences in gross size tend to disappear. The early-maturing average only half an inch taller, at 5 feet 10 inches; and 7 pounds heavier, at 172 pounds. These differences are not significant. In body build, the prediction is that the early-maturing would be more mesomorphic. The tendency is in this direction, but the differences are not significant. The chief thing to note is the wide range of physiques within each group (both in adolescence and in adulthood) and the marked consistency over the years. A slight change is apparent in the direction of greater mesomorphy in eight of the nine late-maturing and they now present a somewhat more developed and sturdy appearance.

Some differences would be expected in constitutional indices of masculinity. Among the late-maturing, the majority of the original study and of those included in the follow-up were rated as having a deficiency in masculine development, at age 17. At age 33, however, Sheldon ratings of gynandromorphy (8) in the two groups showed considerable overlap and only a small and nonsignificant difference in favor of the early-maturing.

Personality differences in adult life have been examined with reference to a number of criteria. Two sources of data to be considered here are Gough's California Psychological Inventory and the Edwards Personal Preference Schedule. The first of these, the C. P. I., attempts to appraise aspects of character and temperament which are significant for social living and interpersonal behavior and which are related to personal maturity and creative achievement. Eighteen scales are available which describe individuals in terms of social responsibility, tolerance, flexibility, academic motivation, self-control<sup>4</sup> and the like (3).

Most of the above scales did not show significant differences between the groups. One outstanding exception is the scale entitled "good impression," (interest in, and capacity for, creating a "good impression" on others)(4). Differences here favored the early-maturing with a significance at the .006 level.

Some of the interpretative phrases associated with high scores on this scale include: "is turned to for advice and reassurance; fatherly; is concerned with making a good impression; is persistent in working toward his goal." High scorers on this "Gi" scale are also designated as responsible, cooperative, enterprising, sociable and warm.

In our groups the early-maturing tend in addition to obtain higher scores on the C. P. I. scales for socialization, dominance, self-control and responsibility. Although none of these shows differences at a significance level better than .07, it is true that the early-maturing have high average

<sup>4</sup> "Self-control" is indicated by a low score on the impulsivity scale.

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scores and present a consistently favorable personality picture with regard to these important social variables.

The phrases and adjectives associated with high scores on these five scales (good impression, socialization, dominance, self-control, and responsibility) remind us strikingly of the social behavior and personal traits attributed, by their peers and by adults, to the early-maturing boys in adolescence. For the total group of 43 boys thus far included in the follow-up, a correlation of .50 (significant at the .01 level) was found between the "good impression" score on the C. P. I., and their level of skeletal maturity 18 years earlier. The corresponding Pearson  $r$  for the socialization<sup>5</sup> score at age 33, and skeletal maturity at age 15, was .40, significant at the .01 level. For these correlations skeletal quotients were computed (skeletal age over chronological age), to make allowance for slight differences in the age at which the skeletal X-rays were obtained.

One other scale yields an interesting difference, significant at the .05 level. This is the scale for what has been termed "flexibility." Those who score high on this scale are described by Gough as tending to be rebellious, touchy, impulsive, self-indulgent, assertive, and also insightful. Low scorers are described as deliberate, methodical, industrious, rigid, mannerly, overly-controlling of impulses, compliant. In these terms, the late-maturers tend to be more "flexible" than the early-maturers.

We might hazard the guess that some of the little boy behavior—the impulsiveness, playfulness and also the "touchiness" repeatedly noted in late-maturing adolescents is mirrored in the description of high scorers on this scale. We might speculate further that in the course of having to adapt to difficult status problems, the late-maturers have gained some insights and are indeed more flexible, while the early-maturing, capitalizing on their ability to make a good impression, may have clung to their earlier success pattern to the extent of becoming somewhat rigid or over-controlled.

The Edwards Personal Preference test shows relatively few significant differences between the two groups. This is a self-report device which measures 15 variables named from Murray's list of needs (2).

On the Edwards test, two of the scales are discriminating for our groups at the 4 and 5 per cent levels respectively. The early-maturing group scores high on the *dominance* scale: "to be a leader, persuade, argue for a point of view," while the late-maturing score high in *succorance*: "to seek encouragement, to be helped by others, to have a fuss made over one when hurt." For the total group of 40 who took the Edwards test at around age 33, skeletal maturing at age 17 correlated .40 with dominance,

<sup>5</sup> This "socialization" scale was first presented by Gough (5) and described as a scale for "delinquency." It is now scored in the opposite direction so as to emphasize the "socialization" side of a socialization-asocialization continuum. In a validation study lowest scores were obtained by those nominated as high school "best citizens"; highest scores by delinquents.

# MARY COVER JONES

TABLE I

SUMMARY OF STATISTICAL FINDINGS FOR THE FOLLOW-UP COMPARISONS

<i>Physical Measures: Means</i>					
	E A R L Y		L A T E		
	<i>Age 14</i>	<i>Age 33</i>	<i>Age 14</i>	<i>Age 33</i>	
Height .....	5 ft. 8 in.	5 ft. 10 in.	5 ft.	5 ft. 9½ in.	
Weight .....	126.9 lb.	172 lb.	93.2 lb.	165 lb.	
Endomorphy* ..	2.6	3.1	3.1	3.3	
Mesomorphy* ..	4.5	4.6	3.9	4.3	
Ectomorphy* ...	3.4	3.4	3.7	3.7	
<i>Psychological Scales</i>					
	M E A N S		<i>Signif. of Difference†</i>	<i>r‡</i>	<i>Signif. Level</i>
	<i>Early</i>	<i>Late</i>			
<i>California Psychological Inventory</i>					
Good Impression ...	25.6	15.7	.006	.50	<.01
Flexibility .....	9.7	13.8	.05	— .23	
Delinquency§ .....	13.9	20.3	.07	— .40	<.01
Impulsivity .....	17.1	23.4	.13	— .31	<.05
Dominance .....	31.7	27.4	.17	.26	
Responsibility .....	32.9	30.0	.19	.35	<.05
<i>Edwards Personal Preference Schedule</i>					
Dominance .....	19.4	12.6	.04	.40	<.01
Succorance .....	7.1	12.4	.05	— .48	<.01

\* Rating on 7-point scale; 7 is high.

† Significance level, Wilcoxon Rank Test.

‡ Pearson product-moment correlation with skeletal age / chronological age, at 15 years.

§ A low score indicates "socialization."

and —.48 with succorance (both significant at the .01 level). Table I summarizes the statistical findings for the follow-up comparisons.<sup>6</sup>

To those of us who have known these young men for over 20 years, some of the most interesting questions remain to be answered. What have been their successes and failures in achieving occupational and personal goals? All are married, and in each group the present number of children averages 2.3. Socio-economic ratings, based on homes and neighborhoods,

<sup>6</sup> Statistical analysis of the data was completed under a research grant from the Department of Education, University of California.

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show no differences for the two groups. There are no significant differences in average educational level, although a slightly higher proportion of the later-maturing have college degrees and the only college teacher is in this group.<sup>7</sup>

There is some indication that more of the early-maturing have attained vocational goals which are satisfying and status-conferring. Among this group five are in professional careers; four are executives; one is a skilled mechanic and one in a clerical position. Of the executives, three are in positions of somewhat impressive status.

Among the late-maturing, four are in professions, two are still university students, two are salesmen, and one is a carpenter. None has attained an important managerial position and several, by their own account and the nature of their work, seem somewhat precariously unsettled.

In the former study descriptive pictures were given of late-maturing boys who illustrated contrasting behavior patterns of attention-seeking activity and of withdrawal. It may be appropriate here to summarize individual records for several of those at the early- and late-maturing extremes.

*Tom*, a late-maturing boy as described in a previous article (7), was at the age of 13 a chubby small boy, very rosy of cheek, sparkling-eyed, laughing and dimpled. He was gay, active, good-humored, emotionally volatile. Even as a senior in high school he was still a "little boy." His voice had not changed. At a time when most of his classmates were paying careful attention to cleanliness and grooming he often came to school with dirty hands and in misfit clothes. He was likely to get into childish scuffles; physically, however, he was not able to cope with his classmates, and would sometimes break down and cry when things went badly.

Unlike most of the physiologically retarded group, he seemed not to be anxious about his immaturity. Growth continued during his college years, when he added four inches to his height, and 20 pounds to his weight. As a graduate student Tom began to play baseball on an intramural team and for the first time, according to his own report, was able to hold up his end of the game. So impressed was he with his own physical gains (there had never been any doubt about his mental abilities) that he raised his sights in regard to vocational goals, achieved a graduate degree and joined the academic ranks as a college teacher.

The interviewer who saw him most recently at the age of 33 described him as: "A genial smiling young man, well integrated, mature, observant, well satisfied with his life situation." He is making excellent progress professionally, and achieving recognition among his colleagues. We now feel that we were justified in the impression gained during his high school years, that Tom was able to cope with the problems of late-maturing without permitting these to create a basic feeling of handicap.

Lonnie, on the other hand, was a late-maturing boy whose physical deficiencies in size and athletic prowess were a persistent source of tension and anxiety. His activity pattern was expressed in excessive verbalizations which became more aggressive and compulsive as he progressed through adolescence.

Excerpts from a staff group conference after a camping trip illustrate this point:

<sup>7</sup> The writer is indebted to Mr. Read Tuddenham who secured much of the interview material through a grant from the Office of Naval Research.

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(W.J.C.) Lonnie was by far the most talkative in this very talkative crowd. . . . Saturday night after most of the boys had gone to sleep Lonnie turned to a question which had to do with the history of religion. He pursued the subject with vehemence.

(M.C.J.) On Sunday morning when we were just finishing breakfast, Mr. G. mentioned a friend who had been working with a growth-promoting hormone. He had hardly uttered a sentence when Lonnie, who had been at the next table, suddenly appeared by his side.

(J.C.) This led to further discussion throughout the day and on Monday, at school. . . . He was again on the subject of the hormone. He wanted to offer himself as a subject because he had always been small and underweight, "skinny." . . .

(T.C.) Lonnie talks with ceaseless energy, with a good deal of ego at stake. . . . "I know a fellow who is a grandson of a Senator. But when we argue I can beat him everytime with cold facts—statistics."

In a current interview many of the same characteristics of restless energy emerged. The interviewer commented that he was hard to rate because of tendencies which were superficially in contradiction to each other. He seemed self-centered, self-sufficient, and with a strong drive for autonomy, but was also dependent on his wife and "socially-minded" in the sense of having abstract interests in groups, social issues, etc. "He seems to have achieved a fairly stabilized adjustment—if not a conventional one. Seems able to work toward long term goals because he has considerable personal freedom. He is tense, rebellious, intellectual, too bent on satisfying his own needs in relationships to relate well to groups either as a member or a leader."

When asked what he would do differently if he had the last 15 years to live over again, Lonnie replied that he would have gone ahead as fast as possible with academic work. "As it was, I was out for Adventure with a capital A and Experience with a capital E—a hollow sort of goal which doesn't satisfy. I travelled a lot but could have done as much living just around the corner."

Late-maturing was merely one of Lonnie's problems, but it led to an impaired status which was an immediate source of frustration, and of rebellious compensatory strivings. These patterns are still apparent in his adult life, although he now seems to take a more realistic view of the roles which are possible for him.

A third late-maturing boy, with a very different set of behavior patterns, was *Charles*—one of the two brothers described in the earlier publication as socially inconspicuous, extremely quiet and self-contained. Although not especially noticed or approved by his peer group, he had a variety of substantial individual interests, and congenial family ties.

Charles is described as "Frank and open in expression, individualistic, and outspoken, primarily an introvert. Though somewhat odd, he is probably fairly well liked by his associates. He seems relatively insecure, requiring support and reassurance. He expresses both hostility and dependence in relation to authority figures. . . . He is mildly self-centered, somewhat imperceptive of others' feelings."

In his own description of current activities, he observed, "My job requires relatively little contact with people. I like it this way. . . . My wife is not overly fond of people. . . . My wife and I are very congenial, we talk over everything together."

Charles, who used to be so shy about girls, so retiring and quietly accepting of his own physical deficiencies, now seems to have established a way of life similar to that of his parents, and one which meets his needs with reasonable adequacy.

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*Howard* was early-maturing. In the eyes of adult observers and classmates, he was advantaged in this respect as well as in family background and personal endowment. He was the younger of two boys from a home well above average in financial security, community status, and interpersonal compatibility.

He was well-liked by both boys and girls but although Howard had the same best friend for many years he seemed less dependent upon social ties than was the case with most youngsters of his age. "The girls would like him to take more interest in them," wrote one observer in the ninth grade. He learned to dance in the eighth grade but was a little shy at first with girls.

By the ninth grade he had lost his shyness, but led too busy a life with his own individual projects and his family's activities to be more than casually interested in girls or to accept more than a few of the many party invitations which he received. "He is a grand-looking boy and the girls feel it a great loss that he is not more interested in them."

Even in his senior year at high school when one girl seemed to be steadfastly claiming his attention, he was described as follows at a staff conference after a party which involved both swimming and dancing: "In his customary manner, Howard left Clare to her own devices and went to join the boys in the pool. He enjoys athletic activities even more than devotion to his lady love. . . . I have a feeling that any girl who goes with Howard will have to stand for that arrangement . . ."

Referring to his social development 15 years later he said, "My interest in girls was not any problem in high school."

Throughout the years of the study, descriptions of Howard stressed his maturity in relation to the group: "Has always been one of the largest and best looking. . . . His prestige among boys is quite marked, with no striving on his part (age 14.4). . . . Howard, like several of his friends this semester, seemed to have reached the stage of 'putting away the childish.' They sat and talked after lunch while the other boys played ball. He has unquestioned prestige, though he seems unaware of it . . ." (14.9).

"Howard is large, seems much more mature than almost any of our group (15.9). . . . Considerable maturity of manner, talked at length to H. E. J., and as an equal, about cameras and photographic equipment" (16.0). A student assistant in the physiology laboratory, impressed with Howard as a 16-year-old said: "He doesn't attempt to make a show of himself or his accomplishments although he now holds the record for vital capacity of 6.40 liters and of 3 minutes 37 seconds for holding his breath."

In spite of the fact that others recognized his accelerated maturity from the time he was in elementary school, Howard, in retrospect, described his own development as physically retarded.

A possible clue to this erroneous belief comes from his position in the family, as the younger boy. His father was past middle age when Howard was born and according to his own analysis of the situation, it was the older brother who had received the understanding and attention of a young, vigorous, active father. Howard missed this when he was growing up. It was his older brother who, in turn, furnished the active, interested companionship in which Howard may have felt a fatherly, as well as a brotherly quality. He certainly compared himself to this older brother and may have, growing up in the shadow of this comparison, thought of himself as inadequate in many ways, including rate of maturing. An interpretation of his response to the Murray pictures suggests that this is so:

Age 17: Howard's conflict seems to lie in his inability to reconcile his position as an individual with his position as a member of his family. . . . He tells of his fear that he is inadequate as a family member. His relationship to his older brother is basic to his difficulty. He is impressed with his

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older brother's superiority. Howard is far from the inadequate person he imagines himself to be in comparison with his brother. It seems likely that he does not feel inadequate except when measuring himself against his exaggerated notion of his brother's accomplishment.

In other circumstances, while his demands on himself are high, he appears to be able to meet them. In his struggle to emulate his brother he has developed qualities basic to superior performance. He shows determination and persistence, a high level of energy, and the capacity to direct and maintain effort toward the goal he sets for himself. In the stories, he exaggerates his weakness but he indicates, as well, his strength.

As an adult in his early thirties, Howard seems to have come to realize his potentialities. "I've developed a good deal more self-confidence. . . . I feel I have had enough education and experience to tackle a job that I have some feel for, so I'm optimistic. In my work, I'm in a dominant position and you build up self-confidence. In college, fraternity life and athletics helped, too."

The interviewer summarizes: "Mr. F. has strong needs for acquisition and mastery. He is dominant, active, a leader and autonomous. It would be hard to keep him down."

*Bob* provides another example of the socially advantaged early-maturing boy. An only son in a prosperous upper-middle-class family, Bob had a pattern cut out for him to follow. He was expected to enter his father's business. His mother knew exactly how she wanted him to grow toward manhood and what course to pursue in fulfilling this goal. "I will not have a dirty boy," she said on one occasion. But this meant that he had to wash up after strenuous play, not that activity was prohibited. She understood that boys like to ride bicycles, build boats, and later, drive cars; that they are happy when playing with neighborhood boys in the backyard as preadolescents, and that as adolescents their social interests include girls, dancing, parties. Creditable scholarship and practice in leadership were encouraged in school.

All of these goals were easily attained. Bob was slightly above the average of our group in intelligence and achievement tests. He was rated consistently on the favorable side, in a wide range of social and personal characteristics. Classmates placed him very high in leadership and popularity. In self-report, he was consistently on the well adjusted side—above the eightieth percentile for the group in all categories, which implied family, social, school and personal satisfactions.

After 15 years, Bob has achieved the realization of his own and his family's goals: "I enjoy my work very much . . . it's a business of my father's that I've always been interested in going into." To the question about how he might live his last 15 years over again he responded: "I'd do them about the same."

Two interviewers, a man and a woman, reveal their own somewhat different biases when summing up their impressions of Bob: The male psychologist wrote: "Mr. A is a tanned, dark-haired, immaculately dressed business man, self-assertive, confident in general bearing but not quite at ease during the interview. He is satisfied with himself and the mores of his business milieu . . . a rigid personality with little insight, little ability to relax and enjoy himself. He puts business first. He has no conflict since he faces no difficult external problems."

The woman who interviewed Bob reacted as follows: "Mr. A fits happily into the 'ideal' stereotype of a successful upper-middle-class business man with no strain and with none of the unfavorable connotations. Although he has social ambitions not yet attained and lets work invade leisure time to a minor extent, he does not seem under pressure about his work. His range of interests are not wide or differentiated . . . he accepts the stereotype of upper-middle-class without much thought . . . his interests are social (in the sense of personal

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enjoyment) rather than directed along power lines . . . he exhibits more freedom from anxiety than any subject I have seen so far."

Unlike the two preceding cases, *Rod* was an early-maturing boy with persistent difficulties in social adjustment. These stemmed in part from a family background which was a handicap in a school where acceptable behavior followed upper-middle-class standards.

In our first records (at 10.5 years) he was described as tall and thin, talkative and outgoing with adults, friendly with strange boys whom he was meeting for the first time. These characteristics were continued during the period of the study.

But from the classroom and the playground came reports of difficulties. While some of the attributes ascribed to him by classmates were socially desirable—"a leader, daring, active in games, happy and enthusiastic," he was also said to be a fighter, lacking in a sense of humor about himself, inclined to be extremely bossy, and attention-seeking. His friendship relations must have been unsatisfactory also, in the early adolescent years, since he mentioned five boys as best friends but was mentioned by none of them in return. He was quarrelsome in games.

During a period of exceptionally rapid growth, in the seventh and eighth grades, this rough and quarrelsome behavior seemed to increase. Rod's superior size and strength provided an easy means of dominating others. "Rod seems driven by an urge to tease; the other boys do not like him very well but cannot dispute his attacks since none of the group approaches his size." Although recognized as a stormy adolescent, often using physical aggression as a defense against his feelings of social inadequacy, he gradually learned to channel his energies in more acceptable directions. He was active in games, and gained some prestige as an athlete. As the other boys caught up with him in size and strength, he was less tempted to draw them into situations involving bullying or fighting. He became more popular, and although still considered "bossy," he was less of a show-off and more considerate of others.

Usually the physical build and stature of early-maturing boys is attractive. During the middle years of adolescence this was not the case with Rod, whose growth in weight did not keep up with his growth in height. He was embarrassed rather than pleased by his height; he worried about it, and seemed to slump as he sat and to stoop as he walked.

In the later years of high school he gained better proportions and began to be rated as "good-looking." He became an expert dancer, and although still preferring athletics he was now frequently included in mixed parties. His classmates rated him as a leader, and as having a good sense of humor.

Thus we see that a boy from "across the tracks" at first used the physical competence accompanying early-maturing as a means of asserting himself in an environment in which he felt ill at ease. He was disliked for his undisciplined behavior, and his physical power was a liability rather than an asset.

By the end of adolescence, however, he had learned more effective social techniques. His size and strength were not to be disregarded, and his classmates began to perceive him in a more favorable light.

After high school Rod saw service in the Pacific—a handsome, swashbuckling soldier who wrote of his adventures to various members of the study staff. He is now settled down as a business man. Interviewers describe him as devoted to his wife and three children, hard-working, ambitious. He impressed an interviewer as not being very perceptive about or concerned with other people's opinions, except as having a general wish to make a good impression. "Interests in others' motivations and his own are relatively superficial. He expresses his feelings impulsively without much anxiety; seems to be able to disregard the

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needs of others but is probably warm to those close to him. Perhaps he is too self-centered to care much about group activity and does not seem to care for the kind of prestige which he would get from exploiting a group."

Though friendly he was thought to be a little defensive about having no recreational or cultural interests to report. He said, "I have three main interests: the family, the business, and sports." But an account of his daily living revealed that the business got most of his attention. He was able to report fair financial success as the result of his devotion to work. He described with some pride the house which he owns: "It is supposed to be elite. I lived on the wrong side of the tracks too long. But now where I live each house has its own patio and there are lots of swimming pools in the subdivision."

### SUMMARY AND CONCLUSION

Boys who had been classified as physically accelerated or retarded in terms of skeletal age during adolescence were compared as young adults at age 33, to determine the long-term effects of rate of maturing upon personality.

Although some cases were lost from the original sample, the data for the follow-up group as reconstituted showed no substantial alteration in the adolescent differentials of the early- and late-maturing.

For the original sample and for the subsample available in the present study, analysis of ratings by adults and classmates indicated that the early-maturing boys were significantly more attractive in physique, more relaxed, poised and matter-of-fact. Consistent differences in other characteristics, such as interest in the opposite sex and "good-naturedness," were obtained over nine semesters of observation. Late-maturing boys were described as more expressive, active, talkative, eager, attention-getting.

The physical differences noted for these boys at adolescence have tended to disappear in adulthood. Personality characteristics as appraised by the California Psychological Inventory and the Edwards Personal Preference Schedule have shown a number of significant differences on the various scales for which the tests are scored (e.g., higher scores for the early-maturing on measures of "good impression" and "socialization.") Where such differences were found, they tended to describe the young adults much as they had been described in adolescence.

No differences were found between the early- and late-maturing in present marital status, family size or educational level. A few of the early-maturing have made exceptionally rapid progress as junior executives and a few of the late-maturing are still somewhat unsettled, vocationally.

The foregoing presentation of data and the case summaries remind us again of the conclusions to the original study which stressed individual differences within each group, resulting from the complex interplay of factors. During the adolescent period late-maturing is a handicap for many boys and can rarely be found to offer special advantages. Early-maturing carries both advantages and disadvantages. In our culture it frequently gives competitive status, but sometimes also involves handicaps in the

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necessity for rapid readjustments and in requiring the adolescent to meet adult expectations which are more appropriate to size and appearance than to other aspects of maturing. The adolescent handicaps and advantages associated with late- or early-maturing appear to carry over into adulthood to some extent, and perhaps to a greater extent in psychological than in physical characteristics.

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